

# ROADS STREETS

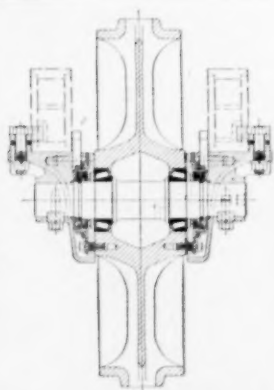
HIGHWAYS BRIDGES  
AIRFIELDS  
HEAVY CONSTRUCTION

MARCH 1954

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UNIVERSITY MICROFILMS  
EUGENE B. POWER  
313 N. 1ST ST.  
ANN ARBOR, MICH.  
COMP-LHY-11-50



How **THE INTERNATIONAL HARVESTER COMPANY** mounts the front track idlers of its TD-14A on Timken tapered roller bearings to insure less friction, longer life, minimum maintenance.



## Topples trees, rips rocks, fills gullies

*TIMKEN® bearings keep it on the go*

**T**HIS International Harvester TD-14A tractor was built to handle hundreds of tough, dirty jobs with minimum time-out for maintenance and repair. One example of its rugged construction: the front track idlers are mounted on Timken® tapered roller bearings.

The track idler bearings have to take heavy radial shock loads when the track hits boulders, trees and other obstacles. And they must also be able to withstand heavy thrust loads, especially when the TD-14A bounces or slips off boulders and large clumps of dirt as well as in turn skids.

The tapered design of Timken bearings lets them handle both radial and thrust loads with ease. And line contact between rollers and races gives them load-carrying capacity to spare. On top of that, Timken bearings are case-hardened to give them hard, wear-resistant surfaces over tough, shock-resistant cores.

Timken tapered roller bearings help solve the problem of deep muck, mud and water by holding housings and shafts concentric. This makes closures more effective. Mud and water stay out, lubricant stays in.

Make sure you specify Timken bearings in all the equipment you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



**TIMKEN**  
TRADE-MARK BEARING CO. CANTON, OHIO  
**TAPERED ROLLER BEARINGS**

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

# P&H

# STABILITY

makes a big difference!



When you need that extra push, you'll be glad your machine is a P&H. With its low center of gravity, better balance and all-welded construction of rolled alloy steels — you can exert more power at the tooth point with less strain or danger of tipping. That's what gives you the added work capacity. You can prove this for yourself as many others have done. Ask to

see a P&H on a job near you. Watch it work!

And while you're there, watch the mobility on true tractor-type crawlers. Note how smooth hydraulic control enables the operator to "feel" the load at all times. It's easier on both man and machine. And far easier on maintenance. You'll sell yourself on P&H in a hurry.

**P&H** POWER SHOVEL AND CRANE DIVISION

**HARNISCHFEGGER CORPORATION**  
MILWAUKEE 46, WISCONSIN

*See your **P&H** Dealer!*

Look to P&H for the most modern features in Power Shovel and Truck Crane construction. There's all-welded design, live roller circle, triple-safe boom hoist, hydraulic control, plus a low center of gravity that provides a higher ratio of lifting capacity to gross weight. This means more **WORKABILITY . . . BETTER PERFORMANCE . . . GREATER SAFETY**. Write for literature on the size you need.

the **P&H** Line



TRUCK CRANES



DIESEL ENGINES



POWER SHOVELS



PRE-FABRICATED HOMES



ELECTRIC HOISTS



SOIL STABILIZERS



WELDING EQUIPMENT



OVERHEAD CRANES





## Two Men Can Easily Handle 14-ft Sections of Sheet Steel Culvert

You don't need special lifting equipment to unload and place long sections of galvanized-sheet-steel culvert pipe.

Take the 18-in.-diameter pipe pictured above. It is 14 ft long and it weighs 214 lbs. Two men can unload and place it in a trench in a few minutes, without equipment.

Large-diameter galvanized-steel pipe weighs only a fraction as much as pipe made of other materials. It comes in longer sections that are easier to ship.

**NUMBER OF FIELD JOINTS REDUCED**  
The longer sections require fewer field joints, a feature that saves costly man-

hours. Three 14-ft sections, for example, can be assembled into a 42-ft culvert by means of two field joints.

Bethlehem does not fabricate culvert or drainage pipe, but does manufacture the Beth-Cu-Loy galvanized-corrugated and flat steel stock used by pipe fabricators. This copper-bearing steel more than meets the specifications set by the American Association of State Highway Officials. It carries a 2-oz zinc coating, as determined by the triple spot test. It comes flat or corrugated, in gages from 8 to 16, inclusive; in lengths 60 in. to 156 in.

Any Bethlehem sales office will gladly furnish detailed information on Beth-Cu-Loy, and the names of fabricators who use it. Write or phone.

**BETHLEHEM STEEL COMPANY**  
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



### **BETH-CU-LOY GALVANIZED CULVERT SHEETS**

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# ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 62 years of continuous publishing in the highway field; combined with Engineering & Contracting and Good Roads Magazines, established in 1892.

MARCH, 1954

VOL. 97

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# PATTERN FOR PROFITS

\* Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

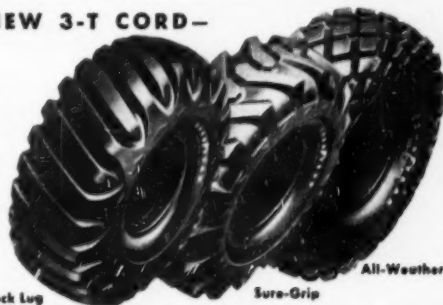
**T**HE clean-cut pattern of these deep-gripping treads shows one big reason why Goodyear's famous Sure-Grip earth-mover tire keeps loads rolling on schedule. It takes long experience to build tires that stand up to any job in every way. But Goodyear has built more tires

for more uses than anyone else on earth!

Out of that tremendous *practical* experience come continuous cost-saving improvements—BIG things like Goodyear's new Triple-Tempered (3-T) cord—now in ALL Goodyear tires!

## NOW TOUGHER, LONGER-LIVED, BECAUSE OF NEW 3-T CORD—

Now Goodyear off-road toughies are longer lived than ever—for they're built of Triple-Tempered (3-T) cord. This new Goodyear process fully controls cord-stretch—keeps tires at their most bruise-resistant, heat-resistant point. This assures vastly greater endurance, reduces cracking, tread and body failures to new LOW lows. Get *all* the facts before you buy or specify another tire! Goodyear Truck Tire Dept., Akron 16, Ohio.



# GOOD YEAR

**MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND**  
We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network.

When writing advertisers please mention **ROADS AND STREETS, March, 1954**

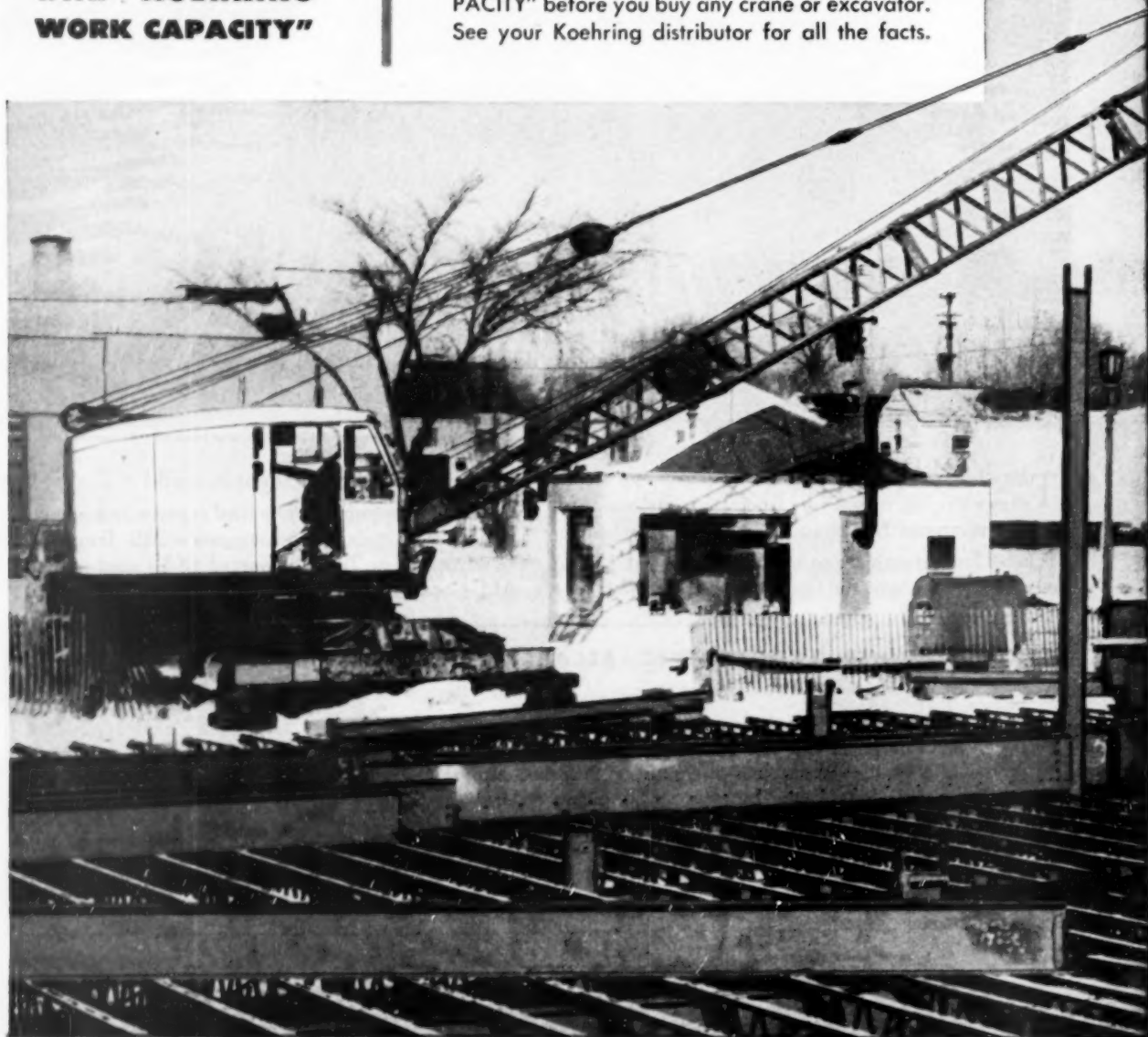


# pick up bigger payloads

with "KOEHRING  
WORK CAPACITY"

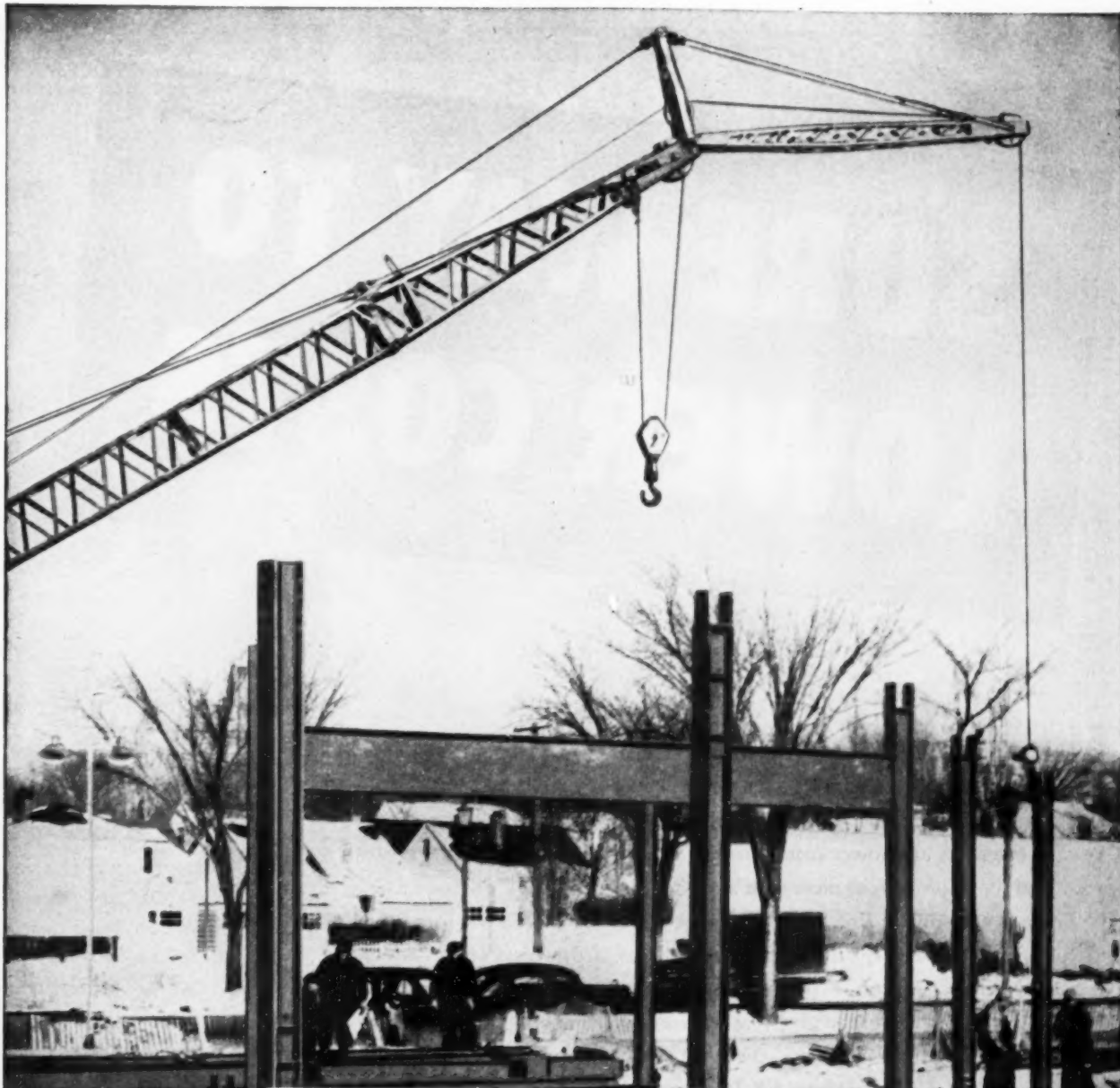
Big payload performance of Koehring cranes and excavators can be measured very quickly. Take a look at lift capacities, for example. Obviously, the machine with the heaviest lift capacity will not only pick up larger crane loads, it also has more power and stability to increase shovel and hoe production — handles bigger dragline and clamshell buckets on a wider work range.

Be sure to check lift ratings and other clear-cut measurements of "KOEHRING WORK CAPACITY" before you buy any crane or excavator. See your Koehring distributor for all the facts.



**KOEHRING COMPANY** Milwaukee 16, Wis.

Subsidiaries: JOHNSON  
PARSONS • EWE-MIX



compare  
for  
yourself

KOEHRING MODEL	SIZE DIPPER	KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines —85% of tipping load)		Other lift capacities
205 CRAWLER	1/2-Yd.	20,000 lbs.	30-foot boom at 10-ft. radius	?
205 ON RUBBER	1/2-Yd.	30,000 lbs.	25 foot boom at 12-ft. radius	?
304 CRAWLER	3/4-Yd.	27,800 lbs.	35-foot boom at 12-ft. radius	?
304 ON RUBBER	3/4-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	?
605 CRAWLER	1 1/2-Yds.	72,300 lbs.	50-foot boom at 12-ft. radius	?
1005 CRAWLER	2 1/2-Yds.	139,000 lbs.	50-foot boom at 12-ft. radius	?



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# SURE WAY TO LOWER COSTS

## AIR COMPRESSORS

run efficiently and economically only when they are lubricated to meet the specific operating conditions. No *one* oil can do a satisfactory job under *all* conditions. The sure way to increase compressor efficiency and lower costs is to buy from a source that has the lubricants and the know-how to meet your exact requirements. Call on Texaco.

There is a complete line of Texaco air compressor oils to assure clean, efficient, low cost performance from every type and size of compressor, under every operating condition. A Texaco Lubrication Engineer will gladly recommend the one exactly right to give *you* best results.

For your rock drills—to extend their life and reduce maintenance costs—use *Texaco Rock Drill Lubricant EP*. Its extreme pressure properties protect against wear, and it prevents rust whether drills are running or idle.

Call a Texaco Lubrication Engineer today—at the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TUNE IN:  
METROPOLITAN OPERA  
radio broadcasts  
every Saturday afternoon.  
See newspaper for  
time and station.



# TEXACO







### **TEXACO SIMPLIFIED LUBRICATION PLAN**

Ask your Texaco Lubrication Engineer about the Texaco Simplified Lubrication Plan. Find out how you can handle all your major lubrication with no more than six lubricants—eliminate mistakes, save time and money.

# **Lubricants and Fuels**

**FOR ALL CONTRACTORS' EQUIPMENT**

When writing advertisers please mention **ROADS AND STREETS**, March, 1954

Bridge Approach in Missouri — Another first chance by Allis-Chalmers Motor Scrapers . . . and the Kansas City owner says it's the best dirt-moving equipment he ever owned.



## Today's Contractors are Keen Judges of Equipment

On earth-moving jobs all over the country, design, performance and service features that were once taken for granted are now getting a careful look . . . because even one extra yard per load, one extra mph. on the haul road can make a big difference when it comes to staying within bidding estimates.

That's why you see Allis-Chalmers Motor Scrapers and Motor Wagons on more and more big construction projects like those illustrated

here. Cost-conscious, profit-conscious contractors have analyzed them, used them and have satisfied themselves that Allis-Chalmers Motor Scrapers have what they need to help them win bids, stay on schedule and make a profit when they are through with the job.

If you have your sights set on some close-margin, hard-to-get business, we *know* it will pay you to go over *all* the facts with your nearby Allis-Chalmers dealer.



**Housing Project in California** — Here, six big TS-300's and their HD-20 partners team up at the Westlake job near San Francisco . . . for a contractor moving over 8,000,000 yards in the last five years.



**Runway Extension in Tennessee** — This TS-300 is the first Allis-Chalmers equipment this contractor has ever owned, but it earned a regular spot fast by high-balling capacity loads like this trip after trip.



**Dam-Building in Illinois** — and the fleet color is Persian Orange. The 176 hp. TS-200's and HD-20's load smoothly, efficiently . . . and the TS-200 is rolling fast toward the fill the instant they break contact.



**Railroad Bed in Montana** — These TS-300's (14-yd. struck capacity; 18-yd. heaped capacity) averaged 14 trips an hour, excavating grade for a five-track rail bed at the site of a new aluminum plant.



**Jet Base in Jersey** — Silt and sand make this a tough job . . . but the extra power of the TS-300's, plus the HD-20's ability to exert full power at creep speeds, paid off in big yardage.

**ALLIS-CHALMERS**  
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



# BETTER YOUR BIDS!



Gradall works where no other machine can operate! In these cramped quarters, its arm-action boom "reaches out" to rip pavement and dig, then swings around to load spoil. On jobs like this, Gradall really pays off!

## Figure with a Gradall

**I**T'S TOUGH to bid *against* a Gradall contractor! He "has the edge" on you, simply because Gradall cuts costs on *any* contract, large or small.

With a *single investment* a Gradall contractor has a machine that does the work of several "specialized" machines, so his overhead and maintenance costs are lower.

And on any contract he gets, he keeps a Gradall *busy*—on many different jobs—so he doesn't lose money on idle equipment. With a Gradall he completes contracts faster.

A Gradall does the job *better*, too—so he can eliminate hand labor costs, cut insurance premiums.

On *operating costs* alone, he can beat you, because Gradall costs very little more to operate than a truck.

But you, too, can *better your bids*—be more competitive—when you figure your estimates on the basis of using Gradalls.

Let your Gradall Distributor *prove* to you how this multi-purpose machine can make money for you. See him for a field demonstration right on your job.



**Gradall cuts costs on all these jobs—and many more**

- Trenching and backfilling
- Excavating
- Placing tanks, culverts, curbs, etc.
- Sloping and grading
- Ditch digging and cleaning
- Ripping and loading old pavement
- Hand finishing and clean-up

**Gradall Distributors in over 75 principal cities  
in the United States and Canada**



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

# Do your trucks lead a double life?

If your trucks have a double function—operation on and off the highway—it will pay you to look into the big advantages offered by B Series Macks . . . the first completely new line of heavy-duty trucks offered by any manufacturer since World War II.

You'll find models—four or six-wheelers—specifically designed for versatile, dependable performance on the roughest of excavation and construction sites, or in highway hauling.

Here are some of the features that operators tell us they like about these great new Macks:

**Famous Mack truck engines, gasoline or diesel, that offer lower fuel costs and increased usable power. High-alloy steel frames—2½ times stronger than carbon steel—and big strong**

**axles give ample load ability. Wider front axles give better maneuverability. Ideal gear ratios meet all conditions. New Mack cab with "Unitized" structure and many improvements in comfort keeps drivers happy.**



**WHEREVER YOU SEE TOUGH JOBS  
... THERE IS WHERE YOU SEE MACKS**

Mack Trucks, Empire State Building, New York 1, N. Y.  
Factory branches and distributors in all principal cities for  
service and parts. In Canada: Mack Trucks of Canada, Ltd.

Mack B-615 six-wheel dump truck, one of 26 Macks owned by A. H. Ferber, Jr., Green Village, N. J., shown working on construction of New Jersey's Garden State Parkway.



2206



**You get the  
headache  
when subgrades  
“Drink”**



When subgrades become saturated with excess water they provide poor support for costly highway pavements. The resulting breakup is expensive and hazardous. Repeated surface repairs are only temporary. The permanent solution is to get rid of excess ground water. You can do this easily and economically with Armco Perforated Pipe.

Water seeps into Armco Pipe through scientifically-placed holes and is drained along the pipe invert. Continued efficiency is assured. Corrugated metal design guards against crushing or cracking. Practically no maintenance is needed.

Installation is quick and simple with a small

crew. The 20-foot lengths of Armco Perforated Pipe are easy to handle. And tightening bolts on quickly-attached coupling bands makes the entire installation an integral unit. Labor costs are low.

Use Armco Perforated Pipe under roads, streets, airports and wherever else excess ground water is a problem. There is a size to meet your subdrainage needs. Write for the complete story in terms of your specific problems. Armco Drainage & Metal Products, Inc., 2024 Curtis Street, Middletown Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

**ARMCO PERFORATED PIPE**





# Adams Traveloader

## Speeds Loading Operations

### For Contractors



Like many other contractors, Burrell Construction Company, New Kensington, Pa., finds a wide variety of uses for Adams Traveloader. D. C. Traister, General Superintendent, says, "We operate two Adams Traveloaders. These machines are kept busy loading surplus material on street construction jobs, loading stockpiled material for road and street grades, etc. We particularly like the heavier construction and better traction of the Traveloader." . . . Ask your local Adams dealer to give you a working demonstration of how the Traveloader will cut loading time and costs—for you!



Here a road contractor uses an Adams Traveloader for picking up surplus dirt on a road-widening job.

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, IND.

### For Counties



Cass County, Indiana, uses an Adams Traveloader for picking up surplus ditch and shoulder material in the process of maintaining proper drainage on its system of 1150 miles of roads. Ross Helms, Road Supvr., says, "We don't know how we could accomplish this program without the Traveloader. We have loaded as many as 185 trucks in one day. Some days we sell enough dirt to pay operating expenses. We also like the Traveloader for its speed in loading from stockpiles." . . . See your local Adams dealer for an on-the-job demonstration of the high-speed, high-performing Traveloader.

This county-owned Traveloader is loading gravel from stockpile for road resurfacing operations.



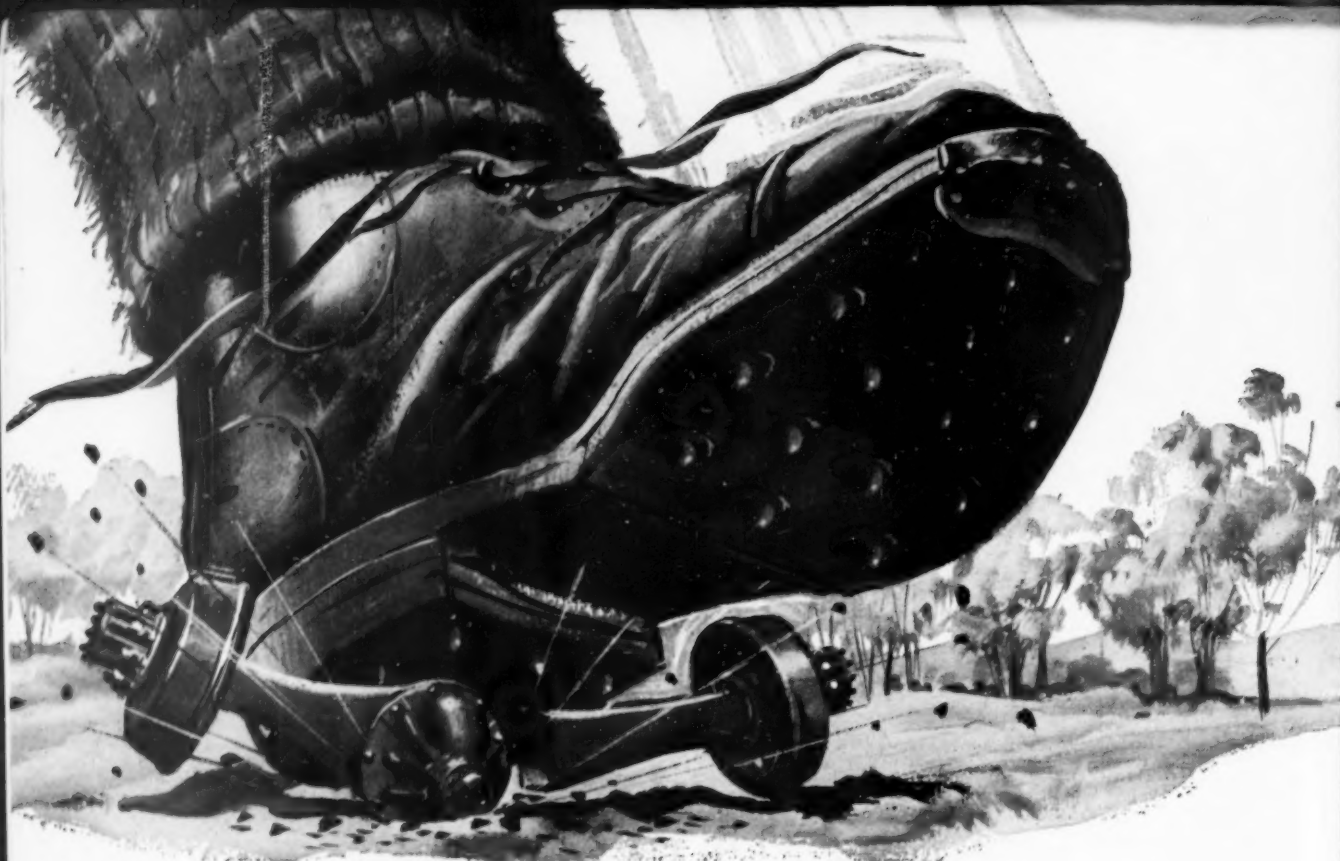
Motor Grader



Traveloaders



Full-Type Grader



# We grind truck axles to in the new Timken-Detroit indoor proving ground... and only

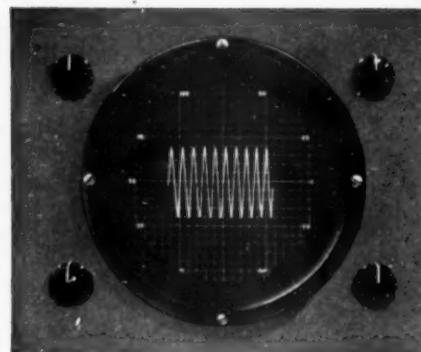
**We jounce, twist and grind them. We abuse, torture and ruin them. We duplicate any on-the-job hauling situation... then add several special brutal tests of our own.**

**And for good reasons!** We can assure you in advance that a Timken-Detroit axle can take a harder beating on the job it was built for than any other axle made!

We capsuled a multi-thousand acre proving ground into one room. Here our engineers put 50 years of experience in building axles for trucks, buses and trailers to work. Here the axles and

gearing are subjected—indoors—to any outdoor hauling condition... and scientifically analyzed.

It's research to the "umpteenth" degree. But *you* enjoy: longer truck life; less maintenance, repairs and downtime; lower operating costs. That's why the smart money of truck builders and owners rides on Timken-Detroit axles and gearing.



**Whatever you haul...** simulated service conditions show up electronically on a screen like this. For instance—a heavily loaded truck on a bumpy, twisting road—then on a level express highway or long grade. What happens to the axle and gearing is measured, charted with absolute scientific accuracy.



## **TDA proves axle quality and performance in this "Torture Chamber"**

Here we simulate actual highway conditions... test quality and performance of axles under any hauling situation, such as duplicating the kinetic energy of 80,000 lbs., G.C.W., at 60 m.p.h. All tests are repeated hour after hour with an automatic cycling control.



**You're hauling overburden . . .** you want axles that can get you up, out and on the road—fast . . . with few shifts, low engine r.p.m. and skimpy gas consumption. You want to stay on the job . . . with little expense for maintenance or repairs plus long axle life. You want Timken-Detroit "Torture-Tested" axles with Hypoid gearing!



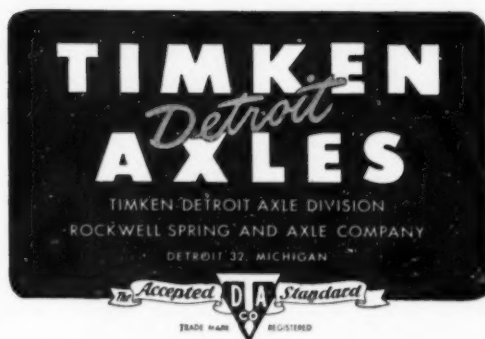
**You're hauling wet concrete . . .** you can't afford axles that "konk out" en-route. You want axles you know for sure will take off and get the mix to the job—on time—ready to pour. You don't want costly maintenance and repairs or shop-time. You want rugged Timken-Detroit "Torture-Tested" axles with Hypoid gearing. They save you money.



**You're hauling cement . . .** you want axles that can get the load up and out of anywhere . . . then speed it to the job and get back quick. You don't want to beat your engine to death . . . or have profit-eating maintenance, repairs or downtime. You want axles that can stand up—Timken-Detroit "Torture-Tested" axles with Hypoid gearing.

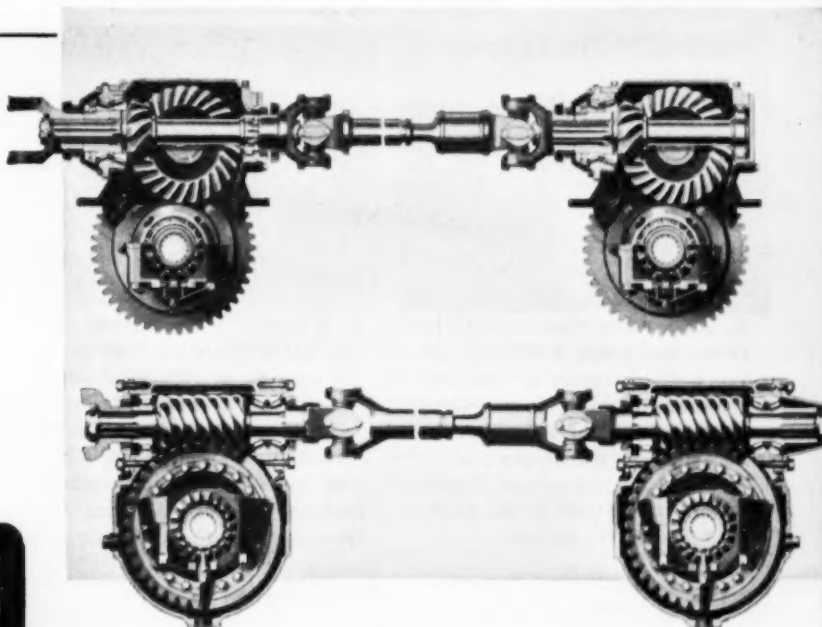
# pieces

**Timken has it!**



**"TORTURE-TESTED"**  
to Save Money on the Job

WORLD'S LARGEST MANUFACTURERS OF  
AXLES FOR TRUCKS, BUSES AND TRAILERS



**For "Million Mile" performance . . . your choice of two types of Timken-Detroit Tandem Drive Rear Axle Units**

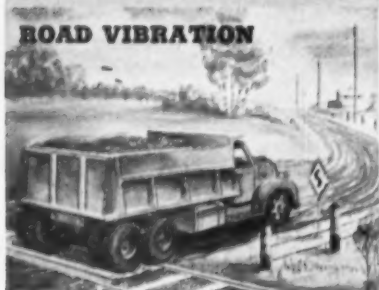
1. Top-mounted hypoid-helical double-reduction final drive. First reduction is hypoid gear and pinion—second is helical spur-gearing. Hypoid gearing, developed for heavy-duty trucks by Timken-Detroit, assures outstanding performance and low maintenance costs for operators everywhere. Large pinions, greater tooth contact give TDA hypoid-helical gearing the ability to stand the "gaff" of extreme shock loads and hard, gruelling hauling service.
2. Famous patented FJ worm gearing, pioneered by Timken-Detroit. "Through Drive" type . . . direct transmittal of engine torque through forward driving axle to rear driving axle. Permanently silent . . . simple, sturdy . . . stands extreme shock-loads without damage. Large diameter worm and worm wheel . . . increased capacity roller bearings . . . easy lubrication . . . light weight make FJ highly desirable for high speed service on any kind of grades.

Plants at: Detroit, Michigan

Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania



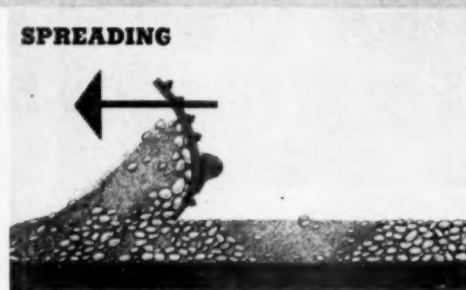
# HOW GRAVEL SEGREGATION IS CAUSED . . .



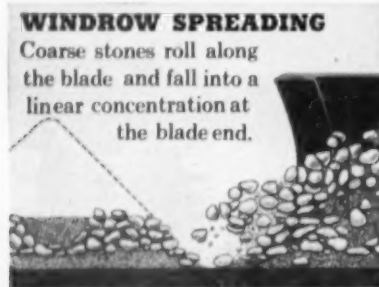
**1.** When aggregates are transported the bumping and vibration causes the fines (dust, small particles and chips) to sift to the bottom of the load while the larger stone works toward the top and sides.



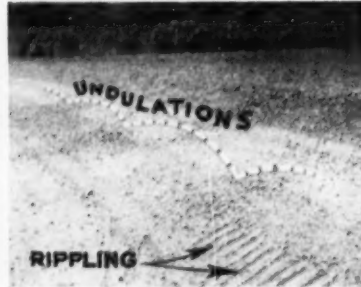
**2.** When the load is dumped on the roadway, the material forms in piles. The larger stones roll from the truck first, the fines fall last. The segregated condition is now reversed; the coarse aggregates are in the base of the pile.



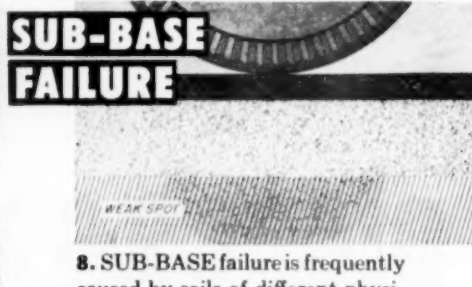
**3.** When the piles are leveled to specified depth, alternate pockets of fines and coarse are formed. Such segregation is highly unstable and a base course so constructed would soon ravel and break up.



**6.** In spreading windrows to final crown and grade, a different but very unstable segregation is caused. Fines are found in concentration in the "heart" of the windrow. Some of these remain in a pocket; others sift to the bottom. Stones which are "topped" by the blade, are rolled to the surface.



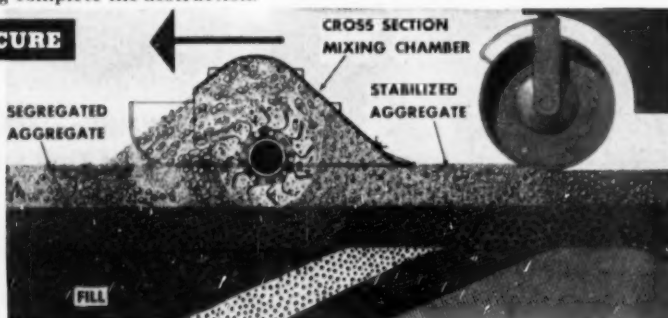
**7.** A road built with gravel in a segregated condition soon develops rippling, undulations, and a "wash-board" condition. Traffic keeps those non-keyed stones in motion. Rain trapped in the hollows seeps through and weakens base and sub-base. Freezing and thawing complete the destruction.



**8.** SUB-BASE failure is frequently caused by soils of different physical characteristics reacting unevenly to moisture. Here a weak spot is developing just below the base course. This would not occur if sub-base had been processed to blend the soils and eliminate voids.

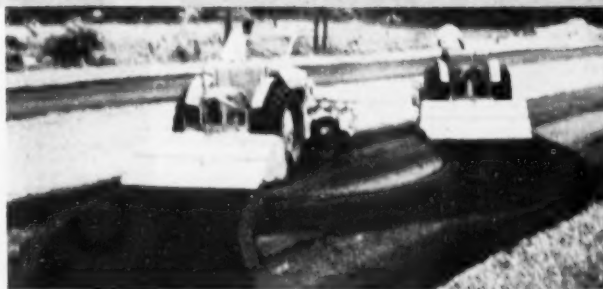
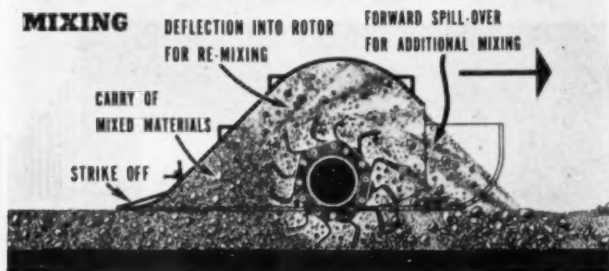


**12.** Here the PULVI-MIXER is stabilizing the sub-base by blending the sub-grade soil horizons (A, B, C,) to attain a course which is uniform in moisture, density and thickness. Weak spots such as that shown in the previous four diagrams will not occur and therefore the base will not require maintenance.



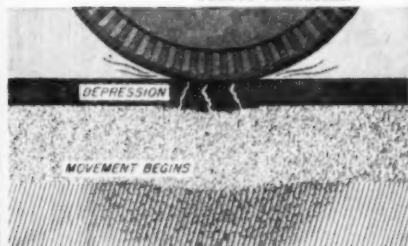
**13.** Above, the Seaman Mixer is shown processing the aggregate for the base, correcting an always-present segregated condition. The material has previously been shaped to final crown and grade. No further blading is needed, for the PULVI-MIXER not only completes the mix but also leaves it in a partially compacted condition, exactly to the grade established, ready for final rolling. This partial pre-compaction is needed because materials left too fluffy are subject to segregation during compaction.

# ...HOW THE SEAMAN MIXER CORRECTS IT

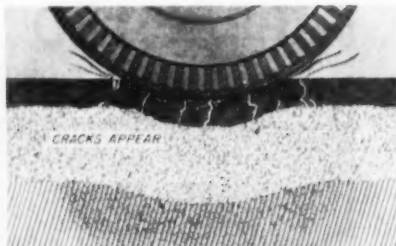


4. The Seaman Mixer blends out pockets of coarse and fines so that particles of each size, from dust up to the largest stone, are intermixed throughout the base. Voids are filled with fines to mortar-in the keyed and interlocked coarse material.

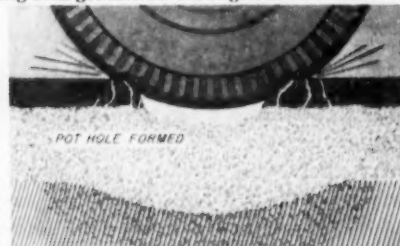
5. It is essential in eliminating pockets of coarse and fines to cross-mix as well as to mix in a longitudinal direction. Only the Seaman Mixer is capable of this operation which provides complete and uniform material placement, blending and gradation throughout the base.



9. The breakdown of the sub-base through the disintegrating effect of moisture is reflected in a localized movement of the materials in the base.



10. As traffic continues to pound the base, cracks develop and the sub-base is weakened further. Sub-base and base course deflections are unequal and the beam effect of the base is unable to carry the load.



11. Complete breakdown of the base course above the sub-base failure has started a chain reaction as more moisture will permeate the fault and establish repeated breakdown cycles along the width and length of the pavement.



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SEAMAN TRAV-L-PLANT. Equipped with pump, tachometer, volumetric meter and spray bar for closely controlled application of bituminous binders or water.

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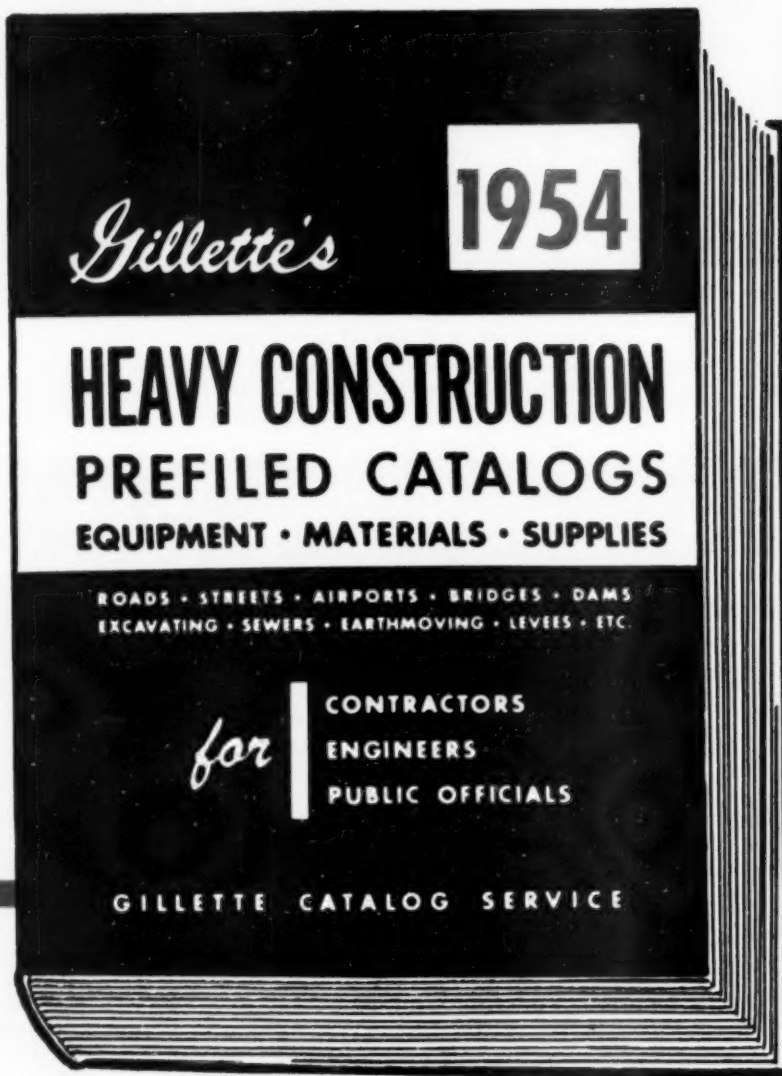
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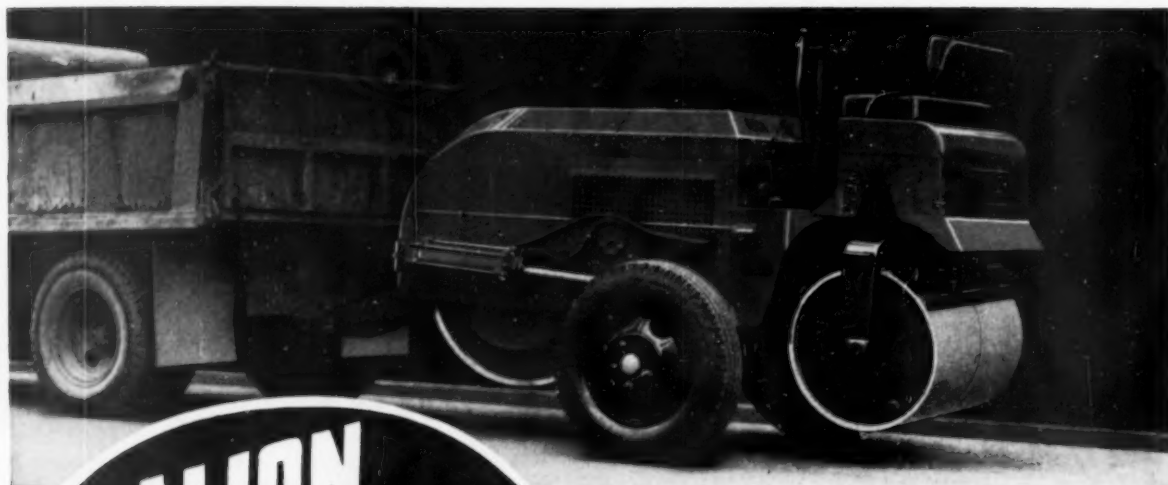
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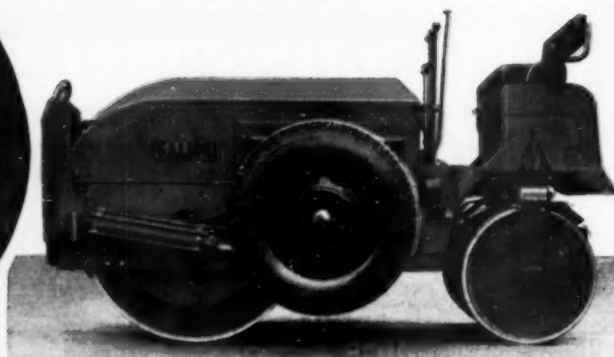
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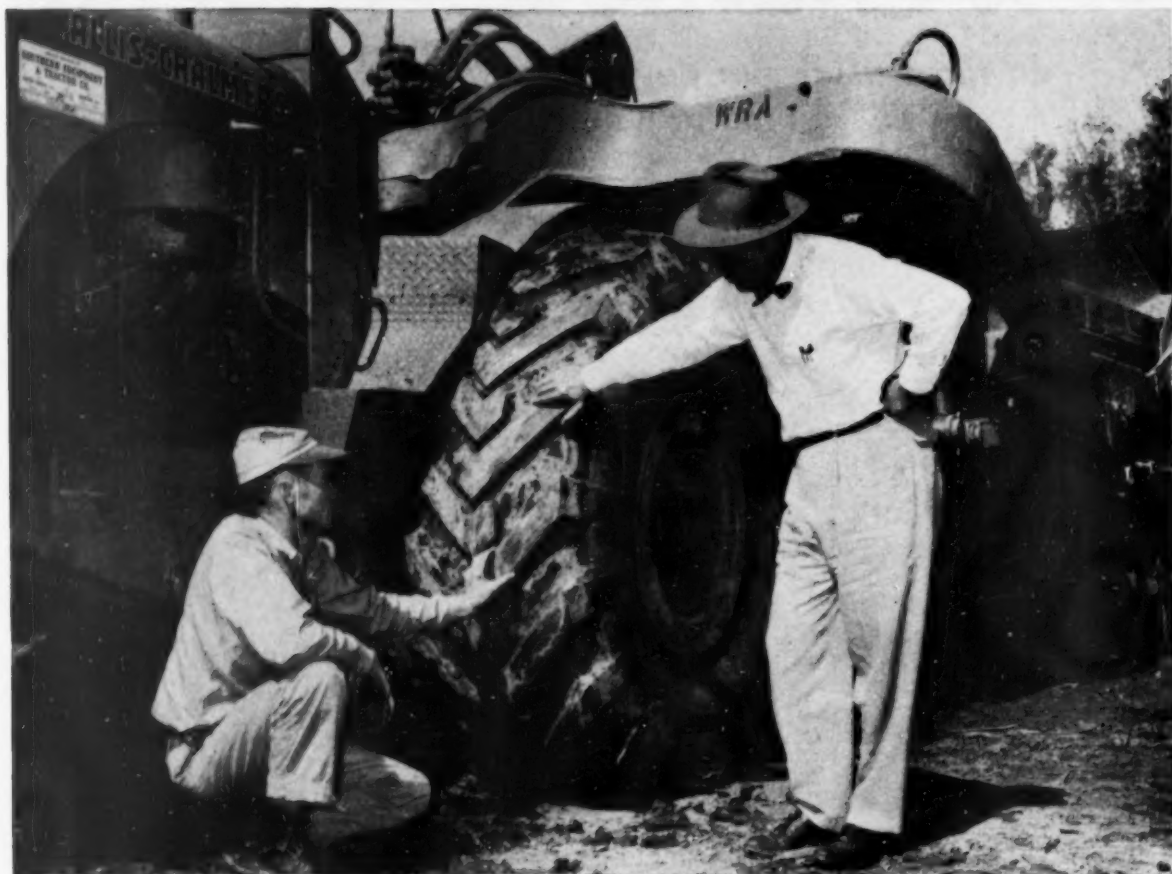
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Specially-compounded rubber in the Super Traction sidewall guards against cuts, resists cracking. And the patented B. F. Goodrich nylon shock shield protects the tire body from bruises.

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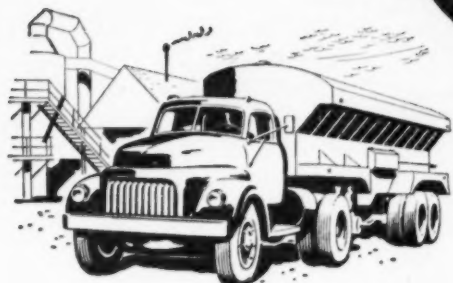
shock shield costs you nothing extra.

The Super Traction is just one of the complete B. F. Goodrich line of tires for every type of off-the-road service. See your B. F. Goodrich retailer. His address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Co., Tire & Equipment Div., Akron 18, Ohio.*



**Specify B. F. Goodrich tires when ordering new equipment**

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## EATON *2-Speed Truck* AXLES

*Axle Division*

EATON MANUFACTURING COMPANY  
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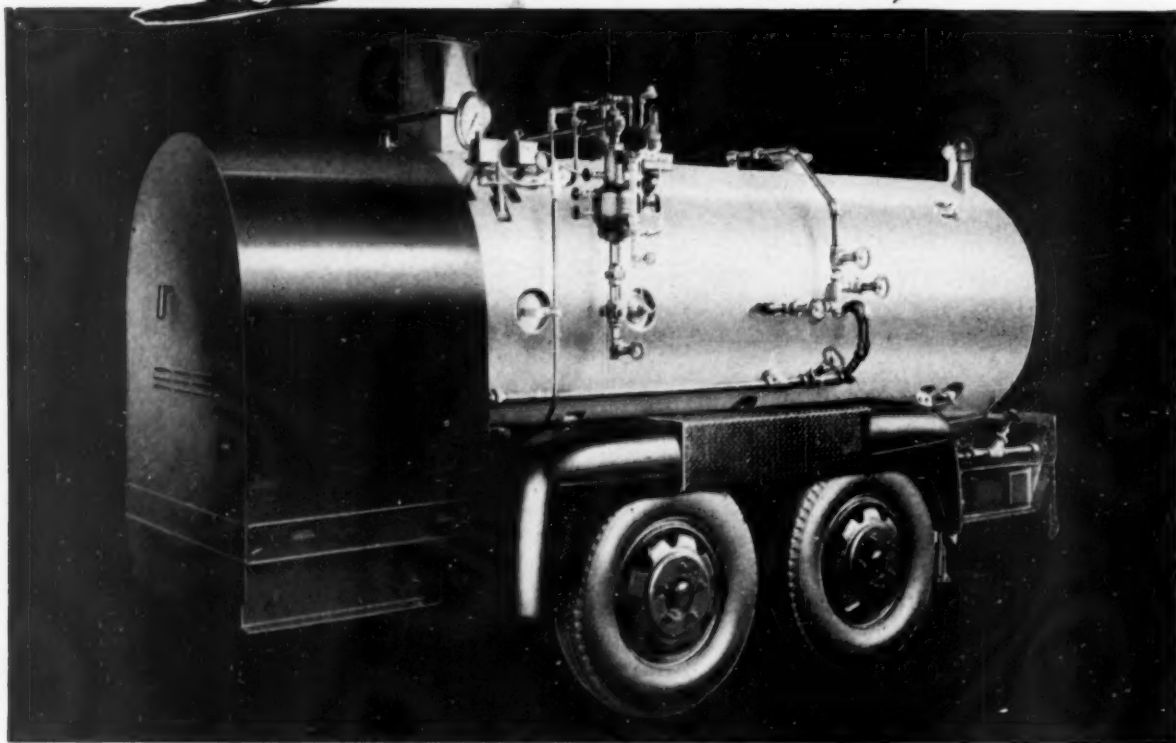


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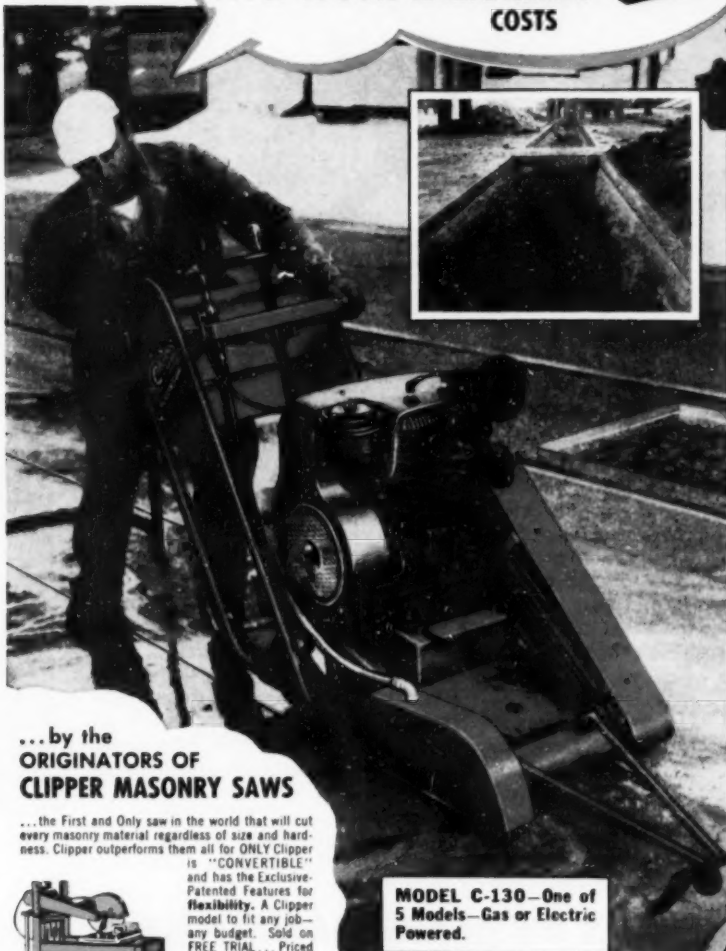






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That's because each machine in the Bucyrus-Erie  $\frac{3}{8}$ - to 4-cu. yd. line is designed from the ground up to handle its rated capacity most efficiently. There are no oversize or undersize dippers used to make "different" models. With Individual Design, speed, power, strength and weight are all properly proportioned, and the machine works most efficiently as a whole.

See your Bucyrus-Erie Distributor soon. He'll show you the other great advantages of Individual Design—fast work cycles, low maintenance, long machine life, low operating costs.

23E53

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When they say,  
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**MOST USED**

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**PIECE OF EQUIPMENT WE HAVE"**

Central Construction Co., Indianola, Iowa is talking about its 4-wheel-drive "PAYLOADER" tractor-shovel.

Thousands of others like them too — and so will you. See your nearby "PAYLOADER" Distributor, or write The Frank G. Hough Co., 768 Sunnyside Ave., Libertyville, Ill.

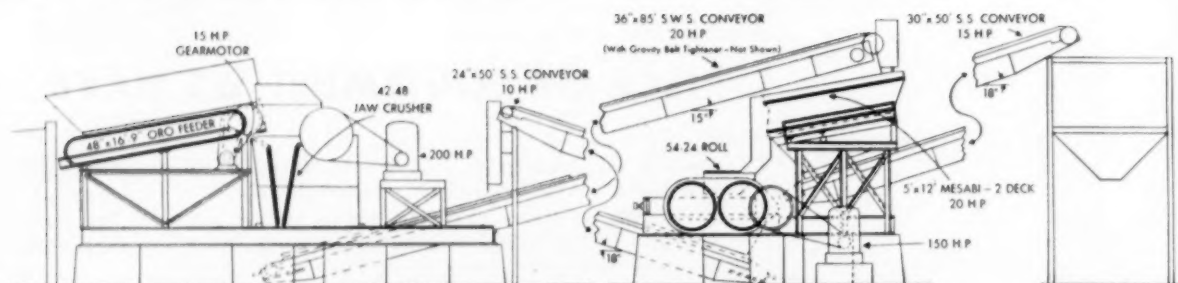
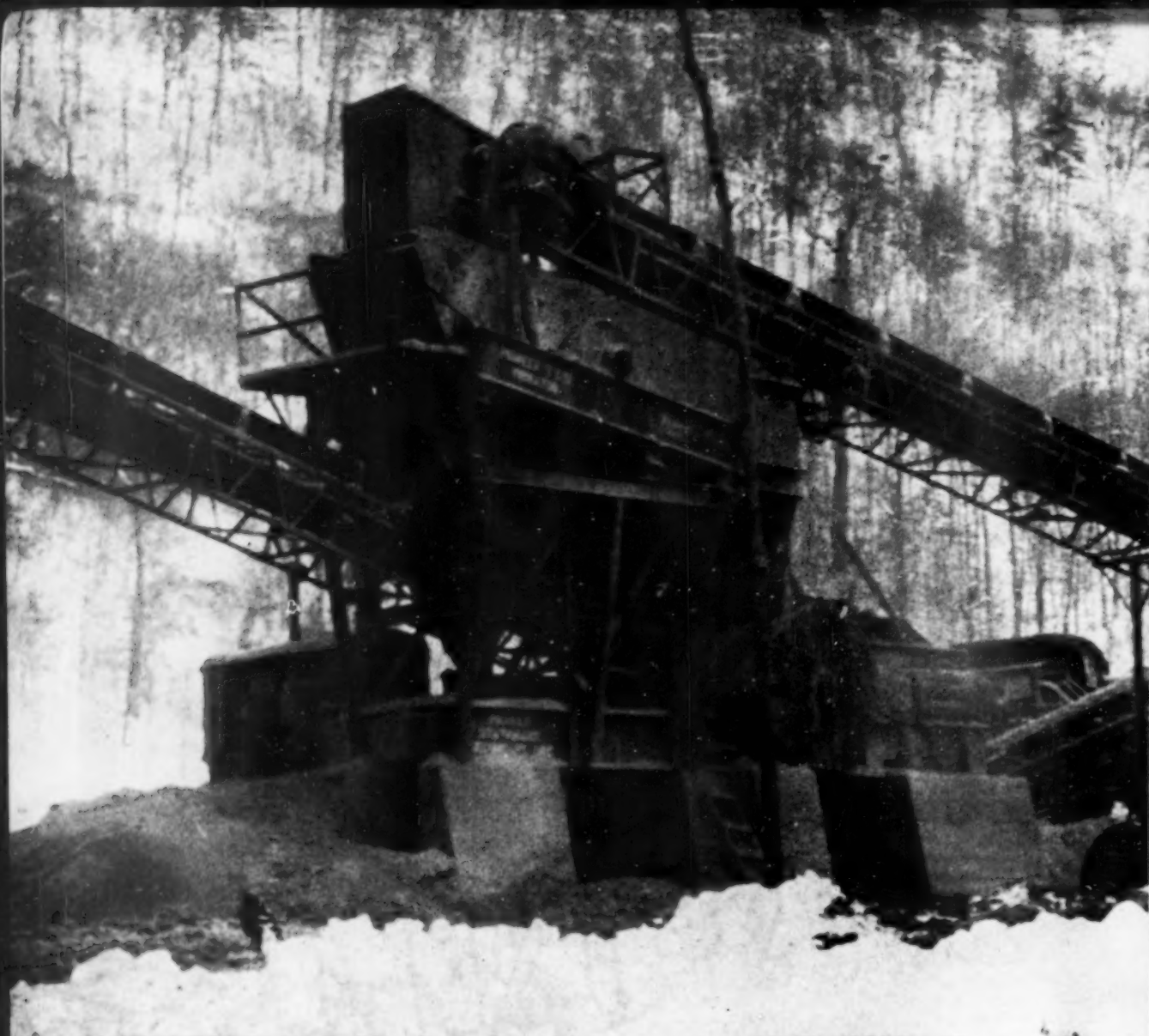
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SAY HERE THE FRANK G. HOUGH CO. • Since 1920







## EXTRA BIG EQUIPMENT SPEEDS WORK ON WEST VIRGINIA TURNPIKE JOB

In the mountain country of West Virginia, big contractors anticipating turnpike jobs are watching closely the rapid progress being made on the new West Virginia turnpike. And the center of attraction is a high capacity, low cost rock crushing plant near Cabin Creek which is preparing 575,000 tons of 3" minus material with a minimum of 15 percent fines for the base course and paving on 20 miles of the new super-highway.

This crushing plant is owned by the Frank Mashuda Co., Gallagher and Nelson, and the Arthur Overgaard Co.

### Crushing 450 Tons Per Hour

The plant operates as Tyler Breslin Quarries of Charleston, West Virginia and is producing specification material from hard sandstone at the rate of 450 tons-per-hour with 100 percent crushing.

Heart of the plant is the world's largest overhead eccentric jaw crusher, a PIONEER 4248 with 4 cubic yard crushing chamber. Equipped with self-aligning roller bearings and hydraulic adjusting mechanism, it represents the modern trend in crusher design.

Crusher base is split horizontally for easier handling, and hydraulic pressure grooves in the shaft under the bearing races, make it possible to remove bearings with fingertips. Moving and stationary jaws are in sections which can be



reversed for longer manganese wear.

Double wall, box type construction gives the base added strength and makes it possible to keep total weight of crusher under 95,000 lbs.

The giant crusher is supplied by a 48" x 16" PIONEER ORO feeder equipped with massive  $\frac{3}{8}$ " thick cast manganese steel pans which take the huge loads dumped by the quarry trucks. The feeder pans have integrally cast links and are driven by manganese steel sprockets with renewable teeth.

Both units (crusher and feeder), along with motor mounting, are joined in a single primary plant mounted on 21" I-beam skids set on a reinforced concrete foundation.

#### Secondary Unit Has Big Roll Crusher

Completing the all-PIONEER installation is a secondary plant consisting of a 54" x 24" roll crusher with one smooth and one corrugated shell, and a 5' x 12' Mesabi-type 2-deck gradation screen.

Support for the Mesabi screen, an extra heavy duty unit designed specifically for rugged jobs, is furnished by an extension of the roll crusher base. Three

PIONEER conveyors totaling 185' in length and a storage bin complete the plant.

In operation, material from the primary plant that passes the bottom deck is conveyed directly to the storage bin; oversize from both decks is returned to the roll crusher for further reduction.

#### Pioneer Helps Select Plant Site

The high-producing Tyler Breslin Quarries turnpike plant shown above was designed by a PIONEER field engineer in close collaboration with the purchaser and his equipment dealer.

This engineer surveyed the site, studied the material and specifications, analyzed the problem, then furnished the details to PIONEER's engineering department which developed the plan shown at the left.

Complete erection prints were provided, and experienced PIONEER assistance was given in the erection of the plant.

But PIONEER's responsibility didn't end when the plant went into operation. Though PIONEER equipment is recognized in the industry as requiring

a minimum of upkeep, an alert, world-wide distributor service organization and factory-trained maintenance men are available whenever quick service is needed.

#### The Pioneer Edge in Action

Couple this service with the creative engineering that has accounted for an impressive list of "firsts" in the design and building of aggregates producing equipment, and you have a combination that's hard to beat. Operators who have seen the performance of PIONEER equipment in the field . . . call it the PIONEER EDGE.

For further details on the turnpike plant and other PIONEER high output, low upkeep crushing and screening installations, write Pioneer Engineering Works, Inc., Minneapolis, Minnesota (subsidiary of Poor & Co., Chicago).

**Pioneer**  
Continuous EQUIPMENT

*Here's news for YOU! \_*





# ANNOUNCING MICHIGAN TRACTOR SHOVELS

*... from engine to tires Power Transmission  
engineered and manufactured by Clark*

Faster, heavier, with greater horsepower than any tractor shovels of comparable capacity, MICHIGAN\* Tractor Shovels move material faster, last longer and cost less to operate! Check these vital mechanical superiorities...

**Clark Torque Converter**

**Clark Power-Shift Transmission**

**Clark Planetary-Wheel Axles**

**Hydraulic Steering Booster**

**Low Level Bucket Tip-Back**

**Short Turning Radius**

**High Tractive Ability**

**Four Speeds Forward**

**Four Speeds Reverse**

**Lights — Standard Equipment**

**Double-Acting Lifting and  
Dumping Cylinders**

**Gasoline or Diesel Engine**

## **Six Models ... To Fit Every Need**

Model 12-B—15 cu. ft. . . bucket drive, rear steer

Model 75-B—1 cu. yd. . . bucket drive, rear steer

Model 75-R—1 cu. yd. . . rear drive, bucket steer

Model 75-A—1 cu. yd. all-wheel drive, rear steer

Model 125-A—1½ cu. yd. all-wheel drive, rear steer

Model 175-A—2¼ cu. yd. all-wheel drive, rear steer

## **For Full Information ...**

All the facts concerning these important new machines are assembled in the MICHIGAN Tractor Shovel FACT-FOLIO—a handy and useful file containing specifications and action photographs. The coupon will bring your copy.

\*A Trademark of Clark Equipment Company

**CLARK  
EQUIPMENT**



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# \$60 PER HOUR

SAVED BY THIS *Athey* HiLoader

A. & S. Gravel Co.'s Athey HiLoader loads excess material from a newly opened street into a high-bodied hauler. The HiLoader also casts the material onto streetside properties where it is spread by a motor grader.

Ask Herb Ashley, of the A. & S. Gravel Co. in Arizona, about the savings that an Athey Force-Feed HiLoader can pile up. Herb reports:

*"With its ability to side-cast to either side, this Athey HiLoader has saved us \$60 per hour. Trucks, that would otherwise be required to handle this production, are eliminated. The Athey HiLoader is the fastest loading machine we have ever used for street work!"*

Ask any Athey Force-Feed HiLoader owner or operator about this high-production machine. They, like Herb Ashley, will tell you with great enthusiasm that the HiLoader handles more material, at less cost, and easier, too. Your Athey-Caterpillar Dealer can show you statements of other owners and can show you a HiLoader at work. Call on him or mail the coupon!

## HERE'S HOW...

The Model 125 Athey Force-Feed HiLoader—can load up to 10 cu. yds. per min. . . . is powered by an economical 101 HP Engine . . . travels at speeds up to 20.0 MPH . . . loads at speeds up to 2.0 MPH . . . has full-floating feeder that prevents bulldozing . . . discharges material up to 45° either side of center or to the rear . . . is hydraulically controlled.



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LITERATURE ON HOW  
A HILOADER CAN  
SAVE YOU MONEY?



Send for free, 8-page booklet on the Athey HiLoader. See your Athey-Caterpillar Dealer or write Athey Products Corporation, 5631 West 65th Street, Chicago 38, Illinois.

## ROADS AND STREETS

# Washington News Letter

Larger federal-aid highway funds for the 1956-57 biennium seem certain at this writing; a new Act may be passed by late spring. Industry representatives in Washington are keeping their fingers crossed.

"Good roads" feeling is high in Washington today. The President in his recent messages to Congress delineated the need, "in the national interest", for efficient highway transportation. And since the lengthy hearings on national highway policy last summer, everyone is acutely aware of the huge size of the road-modernization job.

\* \* \*

February brought hearings on two important highway bills.

House bill H.R. 7818 introduced by Representative J. Harry McGregor (R., Ohio) would earmark \$270 million yearly for federal-aid primary roads (vs. \$247.5 million yearly in 1954-55), \$180 million for secondary roads (vs. \$165 million), \$150 million for urban links (vs. \$137.5 million)—\$887 million in all, against a present \$575 million yearly.

Big departure would be the addition of \$200 million for use only on the Inter-State system of 40,000 miles. This system is only 1% of the rural roads. But it carries 20% of the rural traffic, ties the nation together in peace and war. Before 1952, this system received no special funds. Since then, never over \$25-million annually.

Controversy over H.R. 7818 has centered partly on the proposed "linkage" of the \$200 million Inter-State fund with continuance of the present 2 cent federal gasoline tax. And with the idea of splitting this money among the states, half by population and half under the traditional federal-aid area-population-road-mileage formula.

Better apportion this money, testified AASHO President A. E. Johnson of Arkansas, where the need lies - on a purely population basis. The eight most populous states (California, Texas, Illinois, Ohio, Michigan, Pennsylvania, New York and New Jersey) have 47.6% of the people. 51.5% of the \$11.2 billion Inter-State system modernizing job, dollarwise, also lies in these states. Also better make the federal share 75% instead of 50-50 - the Inter-State system would then have a chance to be built up rapidly and uniformly in all states, for the national good, said Johnson.



Johnson lauded the feature which would permit greater flexibility in state utilization of federal aid. This is the clause permitting up to 25% of the allotment for any one system (primary, secondary, or urban) in any one year to be transferred with Bureau of Public Roads approval to some other system, to meet a local need.

Most controversial clause of H.R. 7818 is the proposal to by-pass the Bureau of Public Roads in administering the secondary road funds. Responsibility would rest directly with the respective state highway departments in general approval and supervision of programming, and in contract and construction supervision. Federal-aid payments would be made on certification by the state highway department that the projects meet with approved secondary road standards. State highway chiefs are divided on this point.

\* \* \*

Also aired at hearings late in February was Senate bill S. 2859.

Introduced by Senator Francis Case (R., S. Dak.) this bill would yield \$360 million yearly for primary, \$240 million for secondary, and \$200 million for urban, \$35 million for Inter-State roads. Also \$100 million of the primary funds would be earmarked for the Inter-State system—\$1,002.2 billion yearly in all.

Urban funds would take in \$65 million specially marked for circumferential roads around cities and for inter-city road links—something else again, classification-wise, and subject to Defense Department approval.

The February hearings brought a parade of leaders to testify. Robert M. Reindollar, president of American Road Builders, stressed road deficiencies, urged a \$3.5 billion annual road construction rate. Lloyd C. Halvorson, of the National Grange, and Matt Trogg, of the American Farm Bureau Federation, both opposed the "linkage" in H.R. 7818. Both favored going easy on "new" categories such as the Inter-State road fund.

John V. Lawrence of the American Trucking Association, speaking for the truckers and also for the National Highway Users Conference, also condemned the linkage feature.

Both bills contain other controversial features not mentioned here, but we've covered the high spots. Other bills are likely to be introduced before Congress gets down to business.

In any event, those close to the picture are confident that we will wind up with a sound federal-aid highway law for 1956-57. And more money.

\* \* \*

# Big Red Power Play

## Scores Against the Weatherman

An Actual Job Report from



CONTRACTOR CRAWLEY AND MASTER MECHANIC RALPH DEVAULT COMPLETE THEIR PLANS...

EVERY MACHINE HAS TO WORK EVERY 10-HOUR SHIFT, RALPH! CAN YOU DO IT?

DON'T WORRY, CHIEF, THE OPERATORS ARE SHARING RESPONSIBILITY FOR THEIR RIGS WITH MY MECHANICS!



PAUL, I DON'T SEE HOW YOU CAN POSSIBLY MEET THE DEADLINE!

TAKE IT EASY, INSPECTOR! WE'RE JUST SHIFTING INTO HIGH GEAR!



THEN THE RAINS COME AGAIN...



PAUL, THESE FOUR TD-24'S ARE THE ONLY CRAWLERS ON THE JOB THAT CAN BRING LOADS UP THIS SLOPPY INCLINE!

YES--THAT'S BECAUSE THEY CAN CLIMB AND STEER WITH POWER ON BOTH TRACKS, BUT THE OTHER CRAWLERS CAN'T!



WE NEED A NEW INJECTOR, RALPH!

OKAY-- I'LL RADIO MARGE AT HEADQUARTERS AND GET PAUL TO FLY IN A NEW ONE!



HERE COMES YOUR PART, RALPH! HOPE I DIDN'T HOLD YOU UP!

WE'LL SLAP IT IN THE MINUTE YOU LAND, PAUL-- AND THAT BIG RED BABY WILL BE HITTING 100% AT STARTING TIME!





CRAWLEY PUSHES RIGHT THROUGH THE WET SEASON, AVERAGES AS HIGH AS 14,600 CU. YDS. ONTO THE LEVEE PER 10 HOUR SHIFT.

WE'VE CHECKED AND RECHECKED OUR MEASUREMENTS, PAUL, AND YOUR DIRT MOVING FIGURES ARE ABSOLUTELY CORRECT! I DON'T SEE HOW YOU DO IT WITH SO FEW MACHINES!



HERE'S HOW, INSPECTOR! 27-YARD HEAPED LOADS... FAST LOADING TIME... AND TD-24'S THAT NEVER QUIT!



AND ON THE SIXTEENTH OF OCTOBER...

HERE'S THE WORD, MEN! WE'VE NOT ONLY CAUGHT UP--WE'RE FINISHED EIGHT DAYS AHEAD OF SCHEDULE, THANKS TO YOU!

DON'T FORGET OUR TD-24'S, BOSS!



YEAH, MAN! YOU CAN'T BEAT FOUR "BIG RED" ACES!

YOUR CREW SURE DESERVES A HEAP OF CREDIT, RALPH! YOU HAVE KEPT DOWNTIME TO A MINIMUM ON THIS JOB.

AND THOSE BIG RED BABIES REALLY MOVE THE DIRT!



ENGINEERS DOWN AT AREA HEADQUARTERS NICKNAMED YOU "LUCKY," PAUL!

IT TAKES MORE THAN LUCK, INSPECTOR! WHEN I GET A MAN-SIZED JOB, I GET MAN-SIZED CRAWLERS!



# Meet the man they call "LUCKY"



Here's Paul Crawley, 32-year-old contractor from Edwardsville, Illinois and Clayton, Missouri. He currently (October, 1953) is working on five major levee contracts with the U.S. Army Corps of Engineers, totalling approximately 2,900,000 yards of dirt and \$1,300,000.

Paul says, "Yes, I know they call me 'Lucky', but you need more than luck to make up nine weeks lost by rain and floods! We made up that time in a little more than three months. We did it with a team of top operators and mechanics who used the right equipment for the job we had to get done.

"My four TD-24 tractors showed their true

worth when they kept right on working in the rain, climbing slippery levee slopes with heaping scraper loads... a job that caused our other tractors so much trouble we had to use them elsewhere. In one clocked 13-day period, we moved 197,700 cubic yards of dirt. TD-24 performance was a tremendous factor in helping us set this record."

By using the best in earthmoving equipment, by hedge-hopping in his two planes and by using a powerful FM radio with two-way phones in all his superintendents trucks, Paul not only kept this project rolling—he made the dirt fly on four other levee jobs at the same time!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

**POWER TO MOVE  
THE EARTH**



## INTERNATIONAL

**Meet the complete INTERNATIONAL line,  
the hardest-working work-teams in the world!**



TD-24 crawler with matched scrapers



TD-18A crawler with matched scrapers



TD-24 crawler with bulldozer



TD-14A crawler with cable bulldozer



TD-9 crawler with hydraulic bulldozer



T-9 crawler with hydraulic bulldozer



TD-6 crawler with hydraulic bulldozer



T-6 crawler with hydraulic bulldozer



Model 2T-75 two-wheel, rubber-tired tractor with 18 heaped-yard capacity scraper



Model 2T-75 two-wheel, rubber-tired tractor with 20 heaped-yard capacity bottom dump wagon



Model 2T-55 two-wheel, rubber-tired tractor with 13 heaped-yard capacity scraper

# Roads and Streets in the News

## Jersey parkway making rapid construction progress

The year 1953 was the "Year of Construction" for the New Jersey Garden State Parkway, noted the second annual report of the New Jersey Highway Authority. A total of \$117 million in construction contracts was awarded, with work currently in progress in each of the ten counties to be traversed by the 165-mile, \$285 million road.

During the year 58 per cent of all parkway engineering was completed, 35 per cent of all actual construction accomplished, and 81 per cent of the anticipated contracts awarded. A total of 135 miles was under construction at year-end, and work was going ahead on 177 bridges, with most ready for steel or decked. Paving was begun on some sections. Asphalt paving will be pushed with an August 1 completion target date.

## Kansas road work sets new records

On the heels of an all-time record volume of road construction in 1953, the Kansas Highway Commission announces a still larger program for 1954.

During 1953 \$36,364,000 in contracts were awarded for construction and maintenance on state roads, which figure will be slightly exceeded by 1954 awards planned. A total of 851 miles of projects were let in the past year on the primary system, 1,216 miles on the secondary system, 2,200 miles of maintenance resurfacing on both systems, and 200 bridges in all.

## S. J. Groves firm gets national safety honor

The Accident Prevention Committee of the Associated General Contractors of Minnesota presented an award to S. J. Groves & Sons, Inc., of Minneapolis for showing the greatest improvement in their safety program among the heavy construction firms participating in the 1953 safety contest. The company reduced their accident rate in 1953 by 96 per cent.

Mr. Thomas Lively, safety engineer for S. J. Groves, Inc., accepted the award on behalf of the company. Mr. Lively has conducted accident prevention classes for supervisory personnel in his company and for various trade schools in the Twin Cities. Two Groves employees, Grant Miller and

Don Griffiths, also received awards in recognition for their outstanding safety work.

## Studies planned for toll highway in Nebraska

Investment firms have offered to pay for a traffic engineering study on the feasibility of a turnpike in Nebraska. The Nebraska Turnpike Authority has accepted this offer, in the absence of any appropriations to date for advance engineering. The offer is said to be contingent on whether a favorable report will be rendered on the feasibility of a similar study in Iowa.

The Authority, headed by Raymond E. McGrath, has headquarters at 1321 First National Bank Bldg., Omaha.

## Oklahoma voters approve three new turnpikes

Largest recent impetus given to the toll road idea was the approval of three more toll highways in the \$150 million program by the voters of Oklahoma.

This OK was given in a special statewide referendum election late in February, marking the first time that the toll road issue has ever been placed directly before the electorate of any state. (In other states the nearest thing to this move has been the approval of proposals to place state credit behind toll road revenue bonds.)

The new Oklahoma law authorizes creation of a new state turnpike authority empowered to finance and construct a total of 309.7 miles of turnpikes in three projects. One would run 85.7 miles from Tulsa eastward

to the Missouri line; another 96.2 miles from Oklahoma to the Kansas line toward Wichita; and a third 127.8 miles southward from Oklahoma City to the Texas line enroute to Wichita Falls.

Heaviest vote of approval (up to 5 to 1 for) is reported to have occurred along the counties traversed by the present 88-mile Turner Turnpike between Tulsa and Oklahoma City, where local hostility originally threatened the approval of that project.

## Chicago and Indiana war over pike location (See Editorial Page)

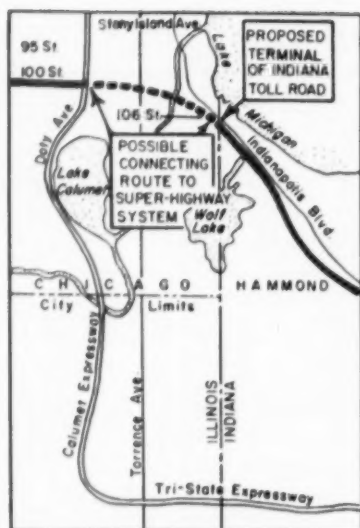
Newspapers recently played up the "costly failure" of the Indiana Toll Road planners to locate the western terminus of their projected trans-state road so that it would connect with Cook County's new tri-state and Calumet expressway links. As shown on the map sketch, these existing facilities, intended as Chicago's expressway outlet to the east and southeast, are by-passed by the Indiana location, which is located several miles to the north.

The Illinois Division of Highways, the County Highway Department and the City of Chicago had previously jointly planned a comprehensive expressway program for the Chicago metropolitan area. This was to extend into and connect with a major expressway project in Indiana, and the agreement with the Indiana Highway authorities was that the highway was to be carried easterly to some point beyond Gary, Indiana. The new Calumet Expressway and the Tri-State, or as it has recently been named, the Kingery Highway, ex-



• Minnesota A.G.O. presents awards to S. J. Groves & Sons, Inc. Shown are Grant Miller, Don Griffiths, Thomas Lively and Allan Cederstrand, chairman of the Minnesota accident prevention committee.





• How new Indiana toll road would fail to connect with the existing expressway system on the southeast edge of the Chicago metropolitan area.

tended southward from 130th and Doty Avenue to about 171st Street where it turned east about 2.5 miles to the Indiana line, and there the Indiana authorities had extended this expressway about 3 miles into Indiana and have purchased right-of-way for nearly two more miles.

The Indiana Toll Road Commission ignored this part of the superhighway system which had already been built and have planned to run the western terminus of their toll road to a point near 106th and Indianapolis Boulevard where it will connect with U. S. Routes 41, 20 and 12 which all converge on one street at this point. From a purely revenue producing point of view, especially in view of the fact that these are high density truck routes, Chicago officials concede that this may be a good location for the route. From the point of view of access to the neighborhoods and business districts to which it crosses, Chicago officials do not believe the Indiana toll road location is well designed. Nor do they believe that it takes into consideration city planning which might indicate that expansion of the terminal district to the southward (it certainly cannot expand northward on account of the lake).

In commenting to Roads and Streets on this impasse, Virgil E. Gunlock, commissioner of public works of Chicago, said that "in any event the Indiana officials have ignored the plans for expressways in metropolitan Chicago. Of course, we will take care of the traffic, that is, the additional induced traffic on our existing street system until something can be done about it. The sad part is

that it may require us to build an additional section of expressway which might cost in the neighborhood of \$25,000,000 in order to connect this facility with our expressway system."

"We have instituted a study to see whether this Indiana Toll Road location might be extended from three to five miles into Chicago as a toll facility with probable collection of tolls at the bridge across the Calumet River. This may have some possibilities but will still be a very expensive piece of construction which the user must pay for in the end."

## New York Port Authority votes big expansion

A \$500 million expansion program for the Port of New York Authority in the next ten years was outlined during January by Howard S. Cullman, chairman.

Designed to keep pace with traffic problems in the New York-New Jersey metropolitan area, the program would provide for extending present facilities and constructing new projects. The job would be divided into three general categories as follows:

- At least \$250 million for construction of a new Hudson River crossing near 14th Street.
- About \$200 million for further development of existing airport facilities, mainly at the Idlewild Airport in Queens and the Teterboro Airport in New Jersey.
- The remaining \$50 million for terminal, harbor and miscellaneous works.

The Authority operates on the principal of financing new projects through revenues established by toll collections on existing tunnels, bridges and other projects.

The third tube of the Lincoln tun-

nel now under construction will cost \$100 million, or \$10 million over the 1952 estimate, due to increased labor and material costs, according to John J. Kyle, chief engineer.

The Authority's interstate bridges and tunnels handled over 78 million vehicles last year, a gain of 7.3% over the previous year. The Authority has a record budget for 1954 of \$134,712,100 which includes over \$74 million for capital outlay, largely for the Lincoln Tunnel.

## Survey for Ohio north-south toll road ordered

During January legislative members of the Ohio State Board of Control announced the availability of \$135,000 to begin engineering feasibility studies for a toll turnpike from Cincinnati north. This route would terminate at Conneaut, with a spur into Toledo. The new route thus would form a sweeping diagonal from Cincinnati to the far northeastern corner of Ohio, with a "Y" branch to the northwestern corner. The undertaking without the Toledo spur would cost an estimated \$400 million.

## Merritt-Chapman & Scott grosses \$104 million

Merritt-Chapman & Scott Corporation's net earnings for 1953 after taxes was reported at \$3,505,471 by Louis E. Wolfson, president and chairman. The figure is 134% over the 1952 profit, despite over four million in taxes. The company's gross was \$104,660,490 for the year, compared with \$80,930,097 for 1952.

- Time magazine notes that expressway projects in New York, Philadelphia, Detroit and Chicago alone will have an aggregate of \$555 millions for construction in fiscal 1955.

## Small bridges still getting in news



• Athens, Wisc. Another small bridge bit the dust as two cars failed to clear when passing and one hit a truss member.

## TURNPIKES MUST CONNECT UP

● The squabble between Chicago and Illinois officials and the Indiana people over the western terminus of the Indiana turnpike underscores the fact that turnpikes tend to be planned piecemeal rather than part of the highway network. This is a fundamental point of weakness that must be watched by all concerned.

The Indiana officials, it seems, went ahead and decided upon the location of their turnpike across the northern part of the state without consulting Chicago or Illinois road officials. As a result the new turnpike will dump traffic off at the state line near 106th Street, at a point where the Illinois people claim that congestion is already heavy and there are many engineering reasons against such a terminal. The Indiana pike thus ignores the existence of the Calumet Expressway and the Tri-State Expressway farther to the south, intended as Chicago's principal expressway leading from the center of the city south and eastward around the bend of the lake. The lack of planning and coordination here will eventually cost many millions of dollars and much delay.

This is no brief either for or against the location of any of the highway sections concerned. The planning of arterial locations in and around metropolitan centers is indeed a complicated problem. Whatever locations are finally decided upon to lead traffic northward into the central area of Chicago, much will depend on providing adequate interchanges, dispersal points, parking facilities and other trappings that must go with the expressway main line to make it an efficient traffic tool.

Many years ago the states got together with the help of federal aid acts by Congress and set up provisions whereby an interconnected network of highways has developed in the past three decades, to the incalculable benefit of all of the people. Today all of us tend to take for granted the fact that our primary federal aid and interstate highway routes pass smoothly over state lines.

Toll turnpikes must do the same, and the public will suffer if any one state bases a location on its own selfish interest without regard to problems in adjoining states.

● V. E. Gunlock, Chicago's commissioner of public works, in a letter to the Editor on this situation, put his finger on a still more fundamental question.

"Toll road planners," he notes, "seem to place too much emphasis on the revenue that can be produced, especially in the early stages of their projects, rather than emphasizing service to the districts through which the roads pass and selection of locations which might induce a well planned growth of the metropolitan areas. This appears to be one basic fault in toll road planning to date, that the roads only serve inter-city or inter-state traffic and do not properly serve the terminal or metropolitan traffic. These things must be reconciled if toll roads are to provide any kind of a solution to our highway inadequacies of today.

"It seems to me they are skimming off the cream of the revenue from cross country traffic and are leaving us with the same old problems or even more intensified problems in our urban areas. The danger lies in the fact that there is a distinct impression that toll roads will solve all of our problems while in fact they only can take care of about ten percent of our traffic. This is the part which was already best handled on the primary or interstate system."

### New Jersey's 3 agencies

Turnpike planning would be better integrated with regional highway needs if the turnpike authorities were more closely linked with the state highway departments in advance planning and construction management.

The recent publicity in New Jersey over alleged employment of the same employees by both the state road and

a toll road body points up this need.

A report that numerous employees of the New Jersey State Highway Department have also been on the payroll of the New Jersey Highway Authority, the body in charge of the \$285 million Garden State Parkway project, is being investigated by Governor Maynor. According to the New York Times a score of employees are involved. The move followed the charge that Ransford J. Abbott, former highway commissioner and now chairman of the Authority, had created duplicating posts for himself and two associates early in 1953, in expectation of eventually moving from the department to the authority.

The merits or demerits of this news item are less important than the overall aspects of the New Jersey situation where two new major highway bodies have been set up by a politically motivated legislature—these being the Turnpike Authority, which built the Jersey Turnpike and is planning expansions, and the Highway Authority, now busy constructing the Garden State Parkway. The two agencies and the state highway department are getting in each other's hair, competing for engineering talent among other things.

The New Jersey situation will, in the end, cost the taxpayers heavily. Legislatures in other states with fledgling turnpike projects should take notice of the New Jersey and the Chicago-area problems, and try to better unify their turnpike development with state highways in the public interest.

● Diversion, new style, is stealing parking meter funds for non-street purposes. This trickery is increasing in many cities, and citizens concerned with their street and parking programs had better wake up. New York City with its 29,000 curbside change gobblers is a prime offender. Diversion of \$2,015,000 to general city funds is reported for 1953, despite a city Charter provision specifically earmarking coin-slot money for streets.

**IT COSTS LESS TO BUILD GOOD ROADS THAN TO HAVE POOR ROADS**



• Contractor's floating equipment at work mid-autumn, 1953, as seen from east shore. Immediately back of nearest crane can be seen steel setting towers used for positioning lower pier rings.

## Design of Richmond-San Rafael Bridge

*Bell-type piers on H-piles, chief pier type adopted for 4-mile-long bay crossing now under construction north of San Francisco. Superstructure to consist mainly of 289-ft. truss spans, with 1,070-ft. cantilever spans over navigation channels.*

**By Norman C. Raab**

Projects Engineers, Division of San Francisco Bay Toll Crossings,  
California Department of Public Works, Berkeley

**T**HE Richmond-San Rafael bridge now under construction with a 1956 completion schedule is the culmination of thirty years of study for a bridge at this site. When opened it will replace the ferry that has in the last few years carried more than one million passengers annually.

The bridge is the more immediate outgrowth of a preliminary engineering report in 1949 financed jointly by Marin County and the City of Richmond and presented by Earl and Wright of San Francisco. This favorable report resulted in an appropriation by the California legislature of \$200,000 for further studies. In 1951 a second report stated the feasibility of financing and constructing a bridge under the provisions of the California Toll Bridge Authority Act, and an additional \$750,000 was made available for preparation of plans and specifications. These sums have subse-

quently been repaid from bond proceeds.

The Authority in 1952 authorized an issue of not to exceed \$12 million Richmond-San Rafael Bridge Toll Bridge Revenue Bonds and in February, 1953, \$62 million of Series "A" bonds were sold to finance construction of an ultimate 2-level bridge, with the upper deck to be built initially. Another \$10 million of Series "B" bonds was authorized for later completion of the bridge including the lower deck level and enlarged approach and toll facilities.

The bridge will form an important link in the highway development program for the Bay area. It will connect U. S. 40, the San Francisco-Oakland Bay Bridge and other important east-shore routes with U. S. 101 in the north coastal counties. The location, coinciding closely with the present ferry route, was determined after

study of seven possible routes, and of the alternative of an earth and rock fill dam with navigation locks across the bay. The latter scheme could not be financed by means available to the California Toll Bridge Authority.

The bridge on final completion will have two 3-lane decks for the main spans, with transition to a single deck design carried on 100-ft. girder spans near shore. Traffic is estimated at 3,900,000 vehicles for the year 1957, growing to 5,800,000 in 1967 and 8,200,000 by 1980.

The bridge will be 4.0 miles long over water and 5.5 miles including approaches. Commencing at Point San Quentin in Marin County, it will consist of the following over-water elements: 2,800 ft. of trestle approach; nineteen 100-ft. girder spans; fourteen 289-ft. truss spans; a cantilever system with a 1,070-ft. navigation span and 537-ft. anchor spans; 10 more 289-ft. truss spans; another 537-1,070-537-ft. cantilever system; 12 more 289-ft. truss spans; and seventeen 100-ft. girder spans.

The two cantilever structures, located at established channel points, will provide clearances of 1,000 ft.

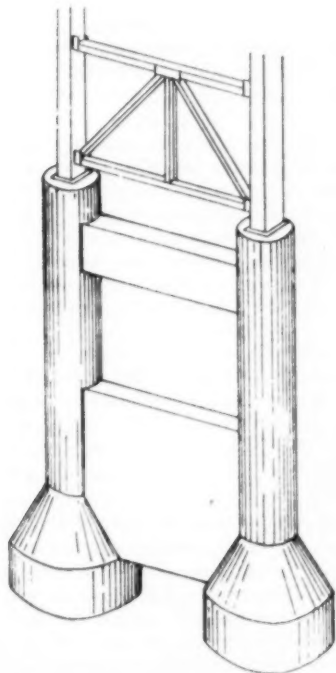


horizontally and 185 and 135 ft. vertically. The bridge and its approaches and toll plaza will be built to freeway standards of roadway design. While the toll ferry will cease operation, under a state agreement, the new bridge will in a limited sense compete with the present Bay bridge, Carquinez bridge, and the Golden Gate bridge. The competition factor is weighed in the traffic and toll estimates.

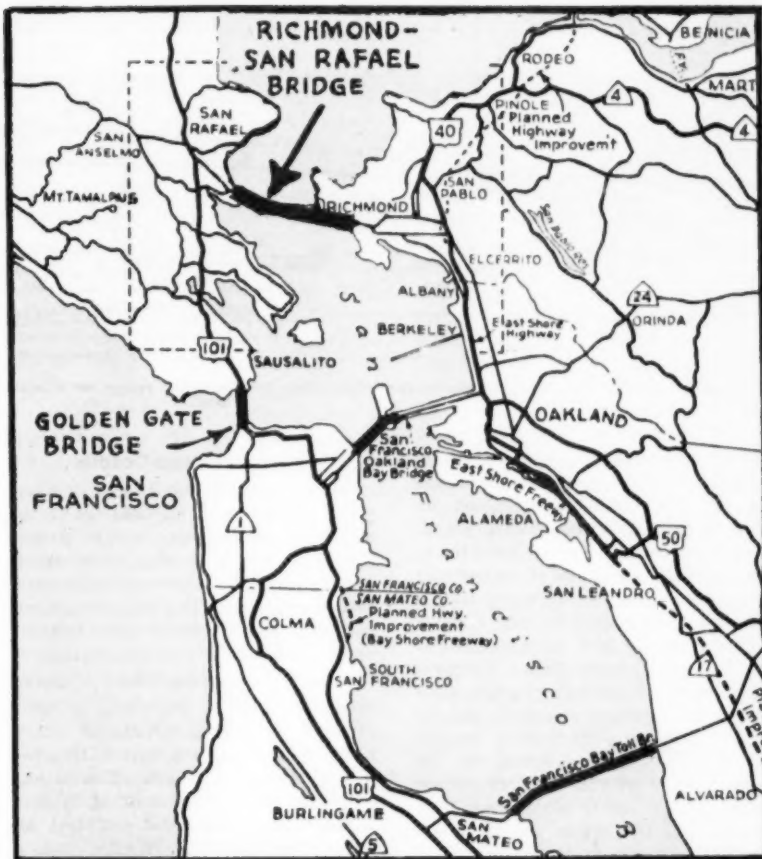
Construction presently in progress includes a contract for \$14,234,550 for the substructure, held by Ben C. Gerwick, Inc., and Peter Kiewit Sons' Co., a joint venture; a superstructure contract for \$21,199,319 by Peter Kiewit Sons' Co., A. Soda & Son, and Judson Pacific-Murphy Corp., also a joint venture; a contract for \$268,787 for the approach fill on the east end; and \$176,730 for a trestle to connect the bridge with the ferry pier, and a \$1,020,938 electrical contract.

### Substructure Design

The substructure as finally determined upon will consist of 62 bell-type piers, 8 cofferdam-type piers, and 9 piers on land, all founded on steel H-piles driven into hard strata. Numerous problems and factors were considered in the planning of the substructure, and in the evaluation of designs, specifications, costs and construction procedures, for the purpose of securing over-all economy.



• Typical bell-type pier which has eliminated costly open cofferdam work.



• Showing the location of Richmond-San Rafael Bridge in relation to the San Francisco Bay area.

Of special importance were the design details which would expedite stage construction. Construction schedules were laid out for practicable rates of construction, permitting completion of foundations as needed for superstructure erection. Planning also was necessary to assure minimum interference with navigation during both substructure and superstructure work.

The crossing site involves water depths up to 50 ft., and soft clay and silt strata extending to bedrock or to compacted sands and gravels at varying depths. Bedrock was found under about two-thirds of the crossing, with practicable working foundation depths from 40 to 210 ft. below mean sea level. The central part is underlain by dense sand and gravel strata at about 140 to 150 ft.

Piers were designed for typical conditions at various locations using specified bearing values for bedrock, compacted sands and gravels, or for H-piles into hard strata. These designs were evaluated as to cost, construction time, appearance, adaptability to construction schedules, and

availability of materials. The designs included caissons extending from the surface to hard strata of rock, sand or gravel, and cofferdam and bell-type piers on H-piles into hard strata.

### Bell-Pier Methods

Caisson-type construction was quickly eliminated as being uneconomical, and comparative studies were then made between cofferdam and bell-type piers for various locations. From these studies it was determined that cofferdam piers would be most advantageous where bedrock is near the surface, near shore. Bell-type piers were found most economical for most other locations and this type was adopted for all such locations to secure the maximum benefits of standardization. This type was also found to permit utmost flexibility in arriving at substructure and superstructure schedules. The bell-type piers have recent precedent in use on several large Eastern bridges, the design and construction techniques therefore being well proven.

Bell pier designs and specifications were so prepared as to give bidders



• Sketch of bridge superstructure showing cantilever system and deck truss design for ultimate two level roadway.

the greatest latitude in choice of method for the various locations and depths. The procedure outlined included the following general steps: excavation of soft clays and silts at each site to about 12 ft. below the mud line; driving of temporary timber piles to carry a grid or mat at level with bottom of pier concrete (about 10 ft. below mud line); accurate placement and holding of grids, slotted to fix locations of permanent H-piles; driving of steel H-piles; setting of steel or concrete shells on the grids (in segments or extending above water line); placement of a tremie seal lift inside the shells to depth 5 ft. above the grid; after setting of seal, extension of tremie concrete inside shells and diaphragms to an elevation above the water line; completion of pier by conventional methods to bridge seats. This general procedure has been followed.\*

\*As will be related in a later detailed report on the contractor's substructure problems and methods.—Editors.

### Superstructure Details

As previously noted, there are three types of spans. These add up to 36 single-decked 100-ft. plate girder spans, 36 double-decked 289-ft. truss spans, and two double-decked cantilever structures. The superstructure contract also includes pier towers, steel painting, and the deck paving.

As with the substructure, the superstructure design included detailed studies of various structural alternatives, related in each case to foundation costs, as a means of securing over-all economy per foot of bridge. Again it was considered essential, as an economy measure, to effect maximum standardization or duplication of structural units. The superstructure work was developed into alternate bidding types, to induce competition; provision was made for stage construction (one deck at the start); scheduling and correlation were worked out to permit simultaneous construction at four different loca-

tions; and steel erection was correlated with electrical and other related work.

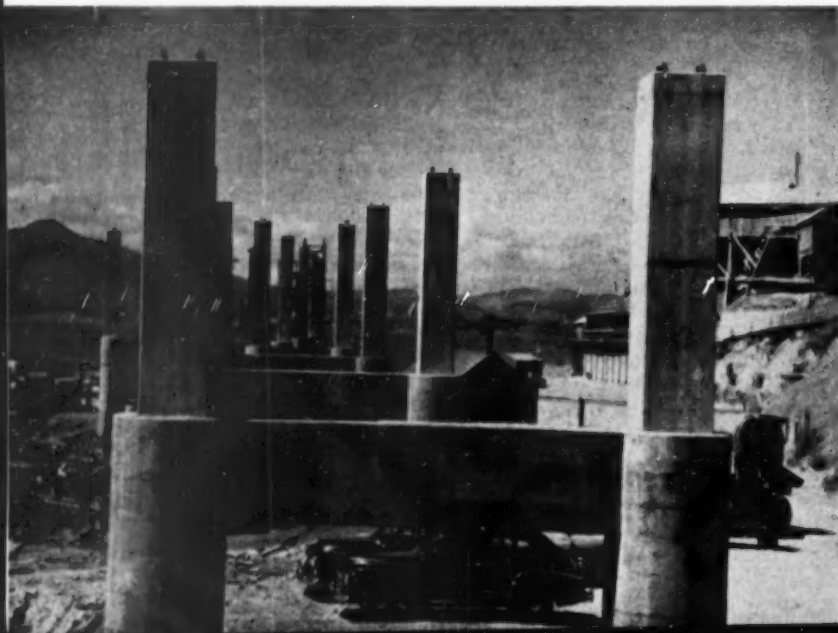
The two cantilever spans (each 537, 1,070 and 537 ft.) were developed with little need for alternate design consideration, the conditions being fixed by navigation requirements.

The design of the truss spans, however, involved considerable preliminary study. Studies were first made for standard span lengths of 289 ft. and of 509 ft. The shorter length, found to be the more economical, was further compared with designs for 200, 250, 290 and 320 ft. spans, to verify its economy. Although the 250 ft. length was found to be economical for certain locations, the decision was made to utilize the economies of duplication and standardize on the 289-ft. span length. An eight-panel design was adopted as being most economical to fabricate and erect, although a ten-panel design would have required slightly less steel.

The design calls for transition from two-deck truss spans to single-deck construction near either shore. This will be accomplished by means of 100-ft. deck plate girders, which afford another example of the economies of multiple use. In alternate spans these girders are continuous over two piers, and in the intervening spans the cantilevered extensions will carry a short suspended section. The continuous girders are largely standard; changes in horizontal and vertical alignment will be taken care of by varying the length of the suspended sections and height of the bridge seats.

It is noted that painting of steel is part of the superstructure contract. The item was included thus, rather than contracted separately, so that the superstructure contractor could better synchronize the painting and insure its control in accordance with specifications. Red lead prime may be applied either in the shop or at the

• Land piers completed late in 1953 on the east shore. Spaced 100-ft. for girder spans.



site, as the contractor elects. Two coats of field paint are specified.

#### Light-Weight Deck

The design of a light-weight deck was given considerable study, and alternate types considered. The deck for the truss spans will consist of 6 in. of light-weight reinforced concrete including a 1/2-in. natural sand-mortar wearing surface. The slab depth for the girder spans will be 10 1/2 in., also including this wearing surface, which has had a good service record on the San Francisco-Oakland Bay Bridge.

Provision is made for distant-future replacement of the deck slab with a steel grid, at 40 lb. per sq. ft. saving in weight, to offset any future liberalization of truck weight limits in the state traffic code. The present design, under the California State Vehicle Code, is based, on an H20-S16 standard loading.

#### Mole Fill on East

A fill was required at the east end of the bridge to provide land for approach, toll plaza, traffic dispersion, maintenance and administration buildings, etc. This fill was awarded and construction completed during 1953, so as to give maximum time for the fill to settle. The fill is about 1,600 ft. long, generally parallel to the shore line, and about 300 ft. wide, maximum, with elevation 38 ft. above sea level datum.

The water depth over the filled area was 7 ft. maximum, with underlying mud depth ranging up to 45 ft. In lieu of the more costly method of dredging, it was determined that the fill could be satisfactorily constructed by end-dumping under controlled conditions to an elevation of about 15 ft. above datum, as a means of displacing sufficient depth of muck to secure a stable fill foundation. This was accomplished with scrapers and dozers, accompanied by sheepfoot rolling to secure specified compaction, as depicted in the accompanying photograph.

#### Gas tax increase sought in Virginia

Governor Stanley of Virginia has called for a 1 cent gasoline tax increase, reversing a position he took during his election campaign. In his recent inaugural address he explained that his opinion has been changed after reexamination of highway revenues which he found "inadequate to meet the urgent needs." The additional one cent, raising the fuel tax to 7 cents, will bring about \$10 million annually additional for road purposes.

## OHIO'S EXPERIENCE WITH CORES IN TESTING LARGE CONCRETE PIPE

*Abstract of a paper by R. R. Litehiser, Chief Engineer, Testing and Research Laboratory, Ohio Department of Highways (at Ohio State University), Columbus; presented at meeting of Committee on Materials of the American Association of State Highway Officials annual convention, November 11, 1953, Pittsburgh, Pennsylvania.*

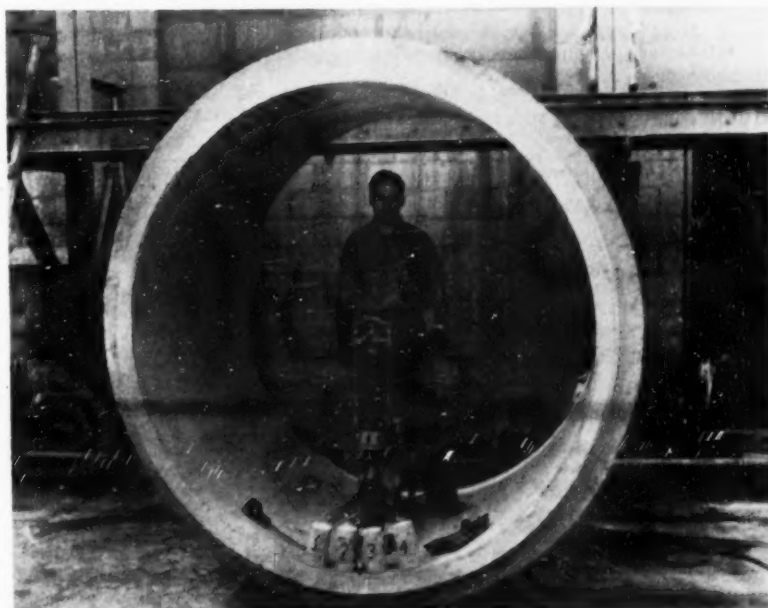
THE Ohio state highway Testing and Research Laboratory began cutting cores from large diameter reinforced concrete pipe in 1945. This was done because of the question that frequently arose as to the representativeness of concrete in cylinders made along with the pipe, as a means of control over the specified compressive strength of the concrete. There could be no question about the representativeness of a core cut from the pipe itself. The weight of large diam-

eter pipe (a 72-in. reinforced concrete pipe weighs approximately 7,000 lb.) made them exceedingly difficult to handle in the standard three-edge bearing test.

The cores are cut with a portable electric drill weighing approximately 150 lb. and standing about 41 in. high. The drill cuts a core approximately 4 in. in diameter, employing a steel bit. Number 40 silicon carbide and water are used to expedite the cutting. On the average, one-eighth inch can be cut per minute. At this rate a core can be cut through a 7-in. reinforced concrete barrel in about one hour. Since 1945 the Laboratory has cut 475 cores from concrete pipe, 80% of which were found to develop the specified compressive strength.

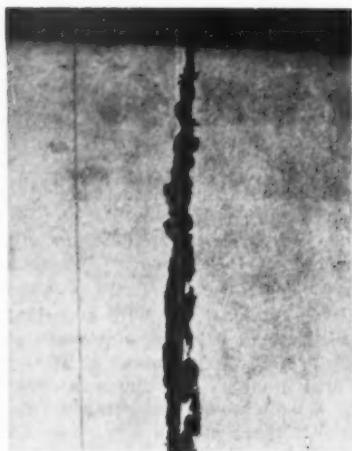
In the course of his remarks Mr. Litehiser outlined the current practice of the Laboratory in evaluating

Number of Pipe Cored and Subsequently Subjected to Three-Edge Bearing Test	Three-Edge Bearing Test			
	Satisfactory		Unsatisfactory	
	No.	%	No.	%
Steel Misplaced in Core	9	77.8	2	22.2
Core Strength Low	5	40.0	3	60.0
Total	14	64.3	5	35.7



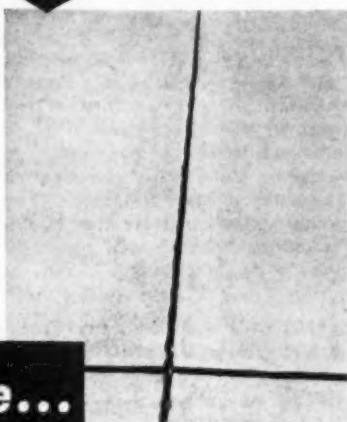
• Portable electric drill, auxiliary equipment, and cores from Ohio pipe coring test. Cores 2, 3 and 4 displayed along with No. 1 to illustrate that ordinarily unbroken cores are obtained.





Old joint filled with a hot poured type sealer. Note cracks which permit water penetration through joint.

Tightly bonded joint uniformly sealed with cold applied Presstite No. 77, forming impervious barrier against water infiltration.



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large diameter reinforced concrete pipe on the basis of cores cut from the pipe. Large diameter pipe are those whose specified ultimate load in the Three-Edge Bearing Test exceeds the capacity of a 50,000-lb. testing machine. Ohio Specifications read as follows on this subject:

"In cases where the test loads of 'a' and 'b' pipe over 66 in. in diameter and 'c' pipe over 48 in. in diameter exceed the range of the available testing equipment, or where the quantity is less than 75 ft. for any size over 36 in. in diameter, the Laboratory may elect to substitute cylinder, core or ring tests. The cylinder shall be 6 x 12 in. and shall be made from representative concrete taken as it is placed in the pipe. The rings shall be of the same dimensions and designs and made in the same manner and under the same conditions as the pipe except that their lengths shall be such as can be tested in the available equipment. In addition, the reinforcement shall be examined for quality, amount and accuracy of placement."

('a' 'b' and 'c' correspond approximately with A.S.T.M. C-75, C-76 Table I and C-76 Table II respectively)

One set of cores may represent up to 400 pieces of pipe, just as in case of a Three-Edge Bearing Test.

A set of cores consists of a minimum of two cores, one from each of two pipes, cut from not to exceed 400 pieces of pipe, plus such additional cores as may be required in case of failure of one or both cores in either the compressive strength test or in the test for adequacy and accuracy of placement of the steel reinforcement. Where more than one day's run is involved, the cores are to be taken from pipe made on different days.

### Core Locations

A core may be taken at either end of a pipe, approximately one foot from the end. In case a core fails in any of the requirements, then another core is cut from the same pipe from a location diagonally opposite the first core. This places the second core on the opposite side and near the opposite end of the pipe. In case the second core fails, that particular pipe is considered not to meet the requirements of the Specification and is discarded. A duplicate section of pipe is then selected from the same day's run and the process of coring repeated. If the duplicate section of pipe fails, all pipe in that day's run are rejected and the coring procedure continued at our option, into one or more additional day's run, if the runs exist.

In case a core is cracked or breaks in cutting, it may be discarded and another core cut to replace it. If a sufficient length remains after a break, the core may be used for the required tests.

If the first core is found satisfactory, then that day's run of pipe is considered satisfactory. In case of failure of the first core and the second core is satisfactory, the day's run is considered satisfactory. The hole or holes may be plugged with the same grade of concrete with which the pipe was originally made and the section of pipe included with the pipe delivered on the order.

The same procedure is followed on the section of pipe from the other day's run selected in the order for coring and the day's run accepted or rejected, depending upon the results of the test on the core or cores.

#### Acceptance Basis

When two day's runs have been found satisfactory on the basis of the core tests, the entire 400 pieces of pipe or such portion as remains, are considered satisfactory and accepted.

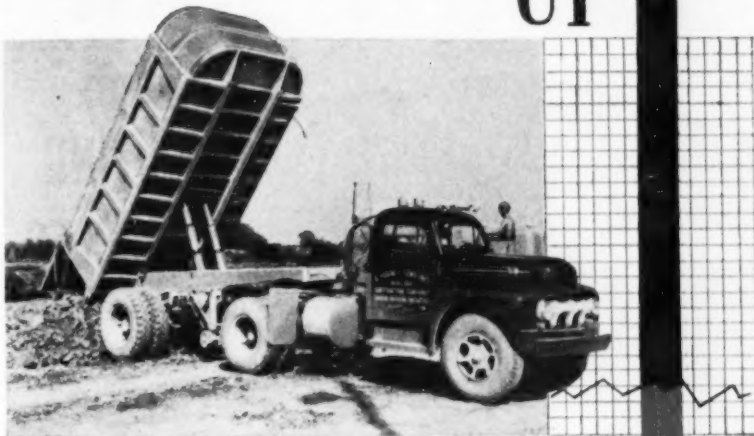
Wherever pipe acquires a rejected status as a result of the core tests, the Three-Edge Bearing Test on the pipe may be resorted to, usually at the supplier's expense, and if the pipe is acceptable on the basis of the Three-Edge Bearing Test, it will be accepted notwithstanding previous tests on the cores. This provision is predicated upon limited experience which indicates that, provided core strength is satisfactory, moderate misplacement of steel may not cause the pipe to fail in the Three-Edge Bearing Test. It is less likely, again in limited experience, that pipe from which cores with low compressive strength are cut, will be able to meet the requirements of the Three-Edge Bearing Test, even though the steel is not misplaced. The Table on page 45 summarizes Ohio's experience in these two respects.

When it is desired to check the absorption of the pipe, an additional core should be cut for this purpose. Absorption is ordinarily not a matter of concern in reinforced concrete pipe which are found to consist of concrete of satisfactory compressive strength.

#### Million under estimate

The concrete sub-structure for the new Delaware River bridge near Philadelphia was awarded to Booth & Flynn Company, at a bid of \$3,647,075. According to a news report this bid was more than one million dollars below the estimate.

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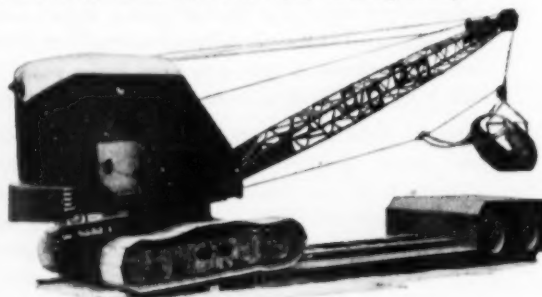
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## Interstate System gets big share of road funds

**A**BOUT one-third of all Federal-aid funds authorized for primary roads and nearly one-half of funds authorized for urban highways have been used for improvement of the national system of interstate highways since the end of the war, according to the latest annual report of the U. S. Bureau of Public Roads.

Calling attention to this fact, a bulletin from the national PAR Committee notes that only for the fiscal year beginning July 1, 1953, has any money ever been specifically provided, by Congress, for the interstate highways, this sum being \$25 million for each year in the present biennium. There is much agitation in Washington right now to increase the specific appropriation for the interstate highways to as high as \$200 million or more, since this relatively small percentage of the roads (about 37,800 miles or 1 1/3 % of the highway mileage of the country) carries a relatively high percentage of all rural highway traffic.

The BPR report discloses that almost \$900 million in Federal-aid funds has been spent on this system in the past five years. However, 76% of the system is still in need of improvement or reconstruction and 16% of the mileage has "critical" needs.

Projects completed on the 37,800 mile Interstate System during the period 1949-1953 with Federal-aid funds were as follows:

Year	Millions Total Cost	Millions Federal Funds	Miles
1949	\$109.6	\$ 57.9	922
1950	168.5	87.9	979
1951	166.5	85.8	1,006
1952	193.0	98.2	1,232
1953	242.8	125.0	1,481

The report warns that a more rapid rate of construction is required if the system is to be made adequate within a reasonable period of years.

## Urban Projects Pay

As for city street improvements, the report states that Federal-aid urban funds were used almost exclusively for such improvements as expressways and major arterials. Two outstanding facts are noted by BPR in showing how such improvements "pay": (1) Traffic volumes are far in excess of the estimates made during the planning stage, so that economic benefits are far greater than expected, and (2) extremely favorable effects on adjacent land value without adverse effect elsewhere are widely evident. The report states that the relief of urban and suburban traffic congestion continues to be a major problem.

Regarding secondary or farm-to-market roads, improvements under



the Federal-aid and Federal highway construction program in the fiscal year of 1953 amounted to 15,403 miles—a record accomplishment. Other improvements initiated, but not completed, total 23,564 miles.

### Missouri contractors report good safety record

Missouri highway contractors who are members of the A.G.C. chapter set a high record for accident prevention in 1953, exceeding the previous year, according to a statement in the A.G.C. publication "The Construction Advisor."

Eighty firms out of the 93 which had state highway work during the year made monthly reports to the Association, reporting a total of 9,974,000 man-hours of work.

Of these firms 20 completed the year without a single lost time accident, involving 580,000 man-hours.

The firms with a no-accident record are listed as follows:

Company	Man-hours
Missouri Petroleum Products Co.	145,286
L. W. Riney Const. Co.	51,108
W. A. Lynn Const. Co.	46,112
F. D. Choate, Contractor	45,007
Grantwood Contr. Co.	34,388
Southard Engineering Co.	31,319
Hedges Const. Co.	30,153
Clark Const. Co.	29,294
Ray & Son, Inc.	24,077
Brooks Const. Co.	21,284
Lee A. Ball Const. Co.	19,588
R. S. Houge	18,615
Runquist Company	16,617
Peter Kiewit Sons' Co.	15,231
Chappell Const. Co. Inc.	13,724
J. F. Culp Const. Co.	9,653
Brunn Const. Co.	9,129
P & S Const. Co.	7,148
List & Clark Const. Co.	6,976
Shoffner & Sons Const. Co.	4,851

Fourteen other firms reported only one lost-time accident during the year, the individual accidents causing time loss ranging from one day to 6,000 hours. The frequency rate for the 80 firms reporting was 37.2, comparing favorably with the national average. The severity record was 5.68.

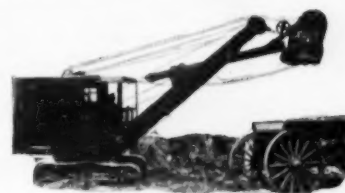
The officers of the A.G.C. organization of Missouri feel that their accident prevention program has paid off. The state accident trend is downward, according to this report, and the Missouri rating bureau maintained by the insurance companies report that 64% of the members have individual experience credits and pay less than the manual insurance rate charged for the average contractor in the state.

Blaw-Knox Acquires All Purpose Spreader Co. Blaw-Knox Co., Pittsburgh, Pa., has acquired the All Purpose Spreader Co., Elyria, O., including the firm's line of highway construction equipment.



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- **1954** — Bring NEW DEVELOPMENTS such as: UNIT with TORQUE DRIVE — SOLENOID ACTUATED DIPPER TRIP — ALUMINUM CLUTCHES — Latest Crane Carrier Design and other UNIT features described in Bulletin U-1153. Write for your copy.



UNIT models available in 1/2 or 3/4 yard Excavators . . . Cranes up to 20 tons capacity . . . Crawler or Mobile types . . . Gasoline or Diesel. Ask for literature.

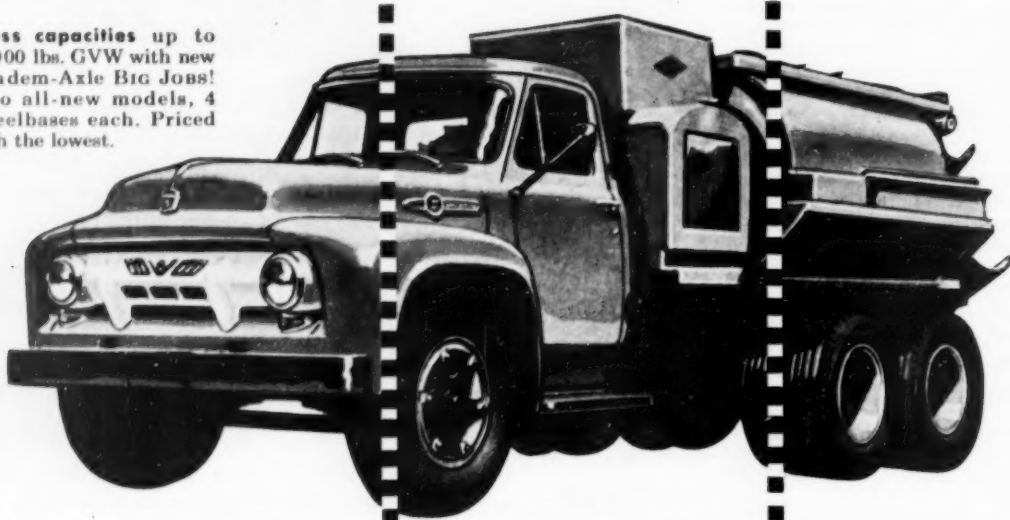
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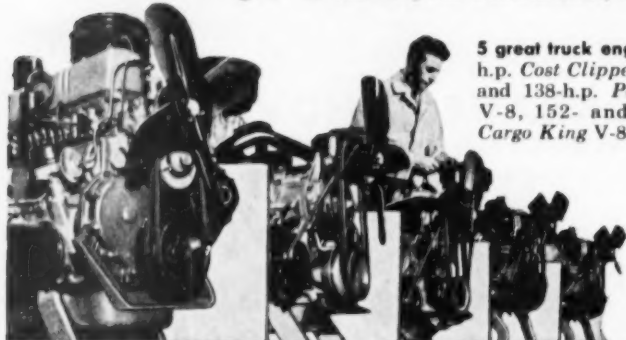
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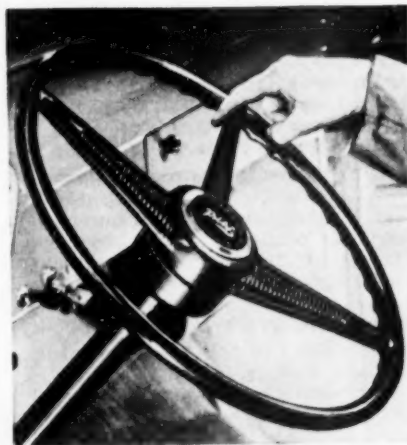
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# Selection, Use and Maintenance of Road Construction Equipment

A veteran contracting executive reflects on some of the problems in equipment selection, bidding and making a profit under today's conditions, also on the economy inherent in the contract method of doing road work.

By A. E. Holt

Senior Vice President  
Guy F. Atkinson Company  
San Francisco, California

**T**HIS paper is concerned with general equipment problems of the contractor and how he usually solves them from the time of his bidding a job to its completion. These problems and their solutions are, I believe, practically identical with those of state, county and city agencies that own some road-construction equipment and perform some of their own repair and maintenance work.

The contractor of today is a far cry from the contractor of forty or fifty years ago when steam shovels, steam rollers, horse-drawn wagons, plows, and fresnos made up the list of major equipment items for a road construction project. A good blacksmith, a pipe fitter mechanic to run and repair a shovel, a good boy on fuel oil and hay, and a few good "Gee" and "Haw" operators took care of all the "equipment" in those days. But today the contractor is faced with hundreds of different types, sizes, and makes of equipment, each of which is supposed to do a certain job a little better than that of a competitor's make. He is faced with several different types of motive power, including electric, gasoline, diesel, gas-electric, and supercharged motors, along with their overdrives, underdrives, retarders, hydrotarders, torque converters, simple and planetary transmissions, automatic gear shifters, hydraulic drives, electric drives, and so on. All this requires wise and proper selection of his equipment. It also brings complicated financial problems. The contractor must plan for purchase, ownership, repair and maintenance, and for as near continual operation as possible, in order to get maximum use of his equipment—maximum life and efficiency—while retaining his competitive position. Idle equipment is of no value and

obsolescence due to more efficient machines coming on the market each year is an enveloping shadow that comes to most new equipment within a few years after it goes to work.

A contractor, as you probably know, is always on the alert for new projects to bid upon. When he sees the official advertisement calling for bids on a new road job he immediately makes up his own cost "guesstimate" of the listed bid items and their quantities. If his estimate is within reach of his present bonding capacity and fits into his present work-on-hand schedule, he obtains a set of the plans and specifications. He then visits the site of the proposed work inspecting every visible indication of the type of materials involved, the exploratory holes and pits, and the general working conditions of the project. During this site inspection a great deal of thought is given to the type of equipment necessary to most economically perform the work, and also to the extent to which the equipment he now owns and has available could be used to advantage. Many times, if the job

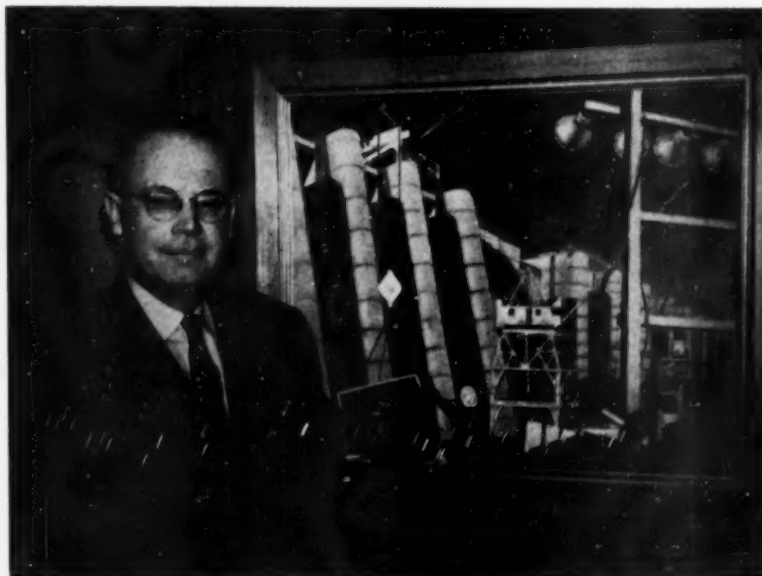
is of considerable size, he does not have all the necessary suitable equipment and here is where, you might say, selection by "equipment economics" enters into the picture.

## First—What Material?

Since the first major items of work on any job are usually the excavation and the embankment or fill, we will briefly discuss the selection of this type of equipment. A contractor usually considers the item of excavation and fill in classes somewhat as follows:

1. Rock (hard, medium, fractured and soft).
2. Tough materials (cemented gravels, hardpan, conglomerates, shales, and large boulder gravels).
3. Common materials (clay, silt loam, sandy sand).
4. Combinations of materials (where there are intrusions of rock or floaters in both tough and/or common materials).

Under each of these four contractor classifications are the working con-



• A. E. Holt, beside an oil painting in the Atkinson offices depicting the firm's work on McNary Dam. One of several oils painted for the company by Mr. Holt's son.

*Presented at the 5th California Street and Highway Conference, University of California, Berkeley; Feb. 4-6, 1953.*

ditions that also have to be taken into account, such as:

- a. Depths and workability of cuts.
- b. Ground water conditions.
- c. Length of haul and grades.
- d. Disposal conditions.
- e. Traffic restrictions.
- f. Weight of materials.

Now all this classification of materials, and consideration of working conditions under each class sounds rather complicated, but it actually boils down to an average of three or four equipment possibilities.

#### For the Small Job

If the materials involved are classified as rock, what will be the contractor's choice of equipment? In the first place, it will depend upon the volume of excavation work involved. If there are only, say, 20,000 cu. yd. or less, he has but a limited choice. He can use what he owns or has available, regardless of its efficiency of operation; he can purchase a new piece of equipment hoping that he will be able to keep it busy enough on future jobs to carry its write-off and depreciation; or he can rent the equipment for the short period of time required on this particular job.

If the work involved runs into 200,000 cu. yd. or more, he has a much greater choice in his selection of equipment, because moving in and out, depreciation, write-off, etc. can be spread over a greater volume without affecting the unit cost per cubic yard to any great extent.

If the materials involved are classified as common, the number of the conditions and problems encountered by the contractor in making his selection are greatly increased because of the many sizes and types of earth-moving equipment that exist today. He has to make his selection from twenty or thirty different sizes, types, and makes of track-laying tractors with scrapers, and rubber-tired tractors and scrapers; he has to consider the economics of the possible use of belt loaders dumping into trucks, and if the haul is too long or through traffic he has to consider the combination of shovels or dragline with trucks to do the hauling.

In common excavation, equipment selection becomes more difficult because it is possible to do the same type of work with fifteen or twenty different sizes and types of equipment; but there are only one or two types out of this group that will perform certain phases of the work more efficiently and more economically than the other remaining fourteen or more types. Consider the most obvious examples. A bulldozer, as you know, is usually the most economical for a short push, sometimes up to 200 ft. with favorable conditions;

### Five Main Points to Remember in Selecting Your Equipment

- In selecting a new piece of equipment make sure that its ownership is economically sound; that there will be sufficient future work to justify its initial purchase before it becomes obsolete or noncompetitive.
- Select equipment more for its universal use than for specialized jobs. (For instance, this is especially important in those districts where snow-and-ice-removal equipment is used only for a few months out of a year. Those districts should purchase as much standard equipment as possible upon which auxiliary snow and ice-removal equipment can be attached when needed.)
- Make every attempt possible to standardize not only the major equipment units but also their power plants and auxiliaries as well.
- Set up and establish rigid rules and procedure for regular inspection and preventive maintenance work.
- Do not over-equip any job or district, because idle equipment becomes a financial drain and is of no value.

on pioneer work it is often the only economical piece of equipment to use. Scrapers, with track-laying tractors, are considered most economical on hauls up to about 1,000 ft., or where short steep grades are encountered. Scrapers, with rubber-tired tractors are considered most economical in common excavation where haul distances vary from 700 ft. up to several thousand. The combination of either the shovel and trucks or the belt type loader and trucks is usually considered most economical for hauls of from 5,000 ft. up to several miles.

#### Many Economic Factors

Therefore, if a contractor had no financial considerations to take into account, and had his own unlimited choice in the selection of equipment that would perform in the most efficient manner each item and class of work involved, he would end up with two or three different sizes of shovels, draglines, clamshells, backhoes, a ditcher or two, an elevating grader, two or three different sizes of dump trucks, several sizes of bulldozers, tractors and scrapers, and so on. For each type, size, and make is more efficient than the others in some particular. The contractor would however, be able to use each piece of equipment only a very few hours each month, and to do this his financial resources would have to be unlimited, which is to say he would have to have a very large income from sources other than contracting.

We have all seen road jobs costing two or three hundred thousand dollars where at least a half-million dollars worth of equipment was at work. This is not uncommon because all of

the equipment being used is probably the contractor's own and is moved from job to job, thereby enjoying a maximum number of use hours for write-off and depreciation. On the other hand, it is not uncommon to see tractor-drawn scrapers loading and hauling dirt beyond the economical limits that I have previously outlined, because that particular contractor has found it more economical to move a small proportion of yardage at a slight increase in cost than to use more efficient equipment and take the expense of moving it in and out.

The particular make, size, or type of equipment depends entirely upon the contractor's (or agency's) study of what I call "equipment Economics." This is a study that goes somewhat beyond a consideration of efficiency in operation. Some specialized piece of equipment, for example, might actually be from 10% to 20% more efficient in performing one or two particular items of work. It would not, however, be an economically sound investment if the prospective owner could not foresee continued use of the machine on similar work sufficient to insure its write-off before it is overtaken by obsolescence or before it loses its competitive position.

#### Selecting the Shovel

On the other hand, if this specialized piece of equipment has proved its efficiency by past performance on other work, if the total costs of its ownership expense, operating cost, and write-off are equal or less than the costs of performing the same work by ordinary methods, and if its future continued use is possible, then the unit is certainly worth considering.

## Selection of Road Equipment—Continued

In the selection of a shovel, size will be determined by the anticipated character of materials to be excavated, the rate of production needed, and the desired mobility. Which manufacturer's make or model to purchase requires considerably more study and judgment. I have had shovel operators on a job spend half their lunch period telling me that the machine they are now operating is the best on the market and can outperform any other make. Within the same hour I can ask the job mechanic what he thinks of the same shovel and he will say, "I was just going to ask you when you were going to get rid of that heap of junk called a shovel, because all it gives us is trouble and its production isn't two-thirds of what we turned out on the last job with that other shovel."

Here are two contradictory statements on the same piece of equipment from men that should know, and in justification of their way of thinking, they are both correct. The operator knows, from his past experience, that the shovel is performing well and producing maximum yardage for the classification of materials it is excavating and for the conditions under which it is working. The mechanic, on the other hand, remembers only some recent adjustment or repairs and has entirely forgotten that on the other job he referred to the shovel worked under conditions that were much more favorable and in materials that flowed "like water" into the bucket, resulting in greatly increased production and less repairs.

Therefore, to actually find out the desirability of owning one make of equipment or another, the investigation should go beyond a questioning of an operator or mechanic. You will naturally hear of all the superior qualities from the salesman, and the opinion of a fellow contractor who owns a similar piece of equipment will be valuable; but the most important information will come from your own or your master mechanic's personal investigation. Before purchasing an unfamiliar new piece of equipment it is most wise to personally visit two or three projects where the particular model or type of equipment is actually working. Make your own time studies of operation and production.

Find out, if possible, the rate of down-time for adjustments and parts replacements, and what mechanical difficulties they have had to date. This personally collected data added to the information obtained from the salesman, contractor, operator, and mechanic should then be analyzed, weighed and compared. If

this procedure is followed, and combined with considerable good judgment, the question of the selection of the most suitable and most economical equipment to own will be solved. This appears to be rather time-consuming and costly, but when the possible investment in a new unit may run to fifty thousand dollars, or up to one hundred thousand dollars or more if a fleet is being considered, there should be no doubt that a thorough study of "Equipment Economics" is in order.

While the above applied to excavation work, the same principles apply to the selection of paving, concrete, and all other roadbuilding equipment.

At this Conference last year, Mr. Harold Hess spoke on Preventive Maintenance of Construction Equipment. He spelled out an excellent program which, if followed as he outlined it, would considerably cut the costs of maintaining and operating all types of equipment.

### Consider Standardization

I do want to stress one very important relationship between selection of equipment and its maintenance and operating costs. The owning of equipment requires repairs and replacement of parts at certain intervals of time. This, in turn, requires the warehousing and handling of a considerable inventory of repair parts. It also requires mechanics that are well trained in the repair and maintenance of each piece of equipment. Therefore, in the selection of equipment, full consideration should be given to standardization. I don't mean that every truck, shovel, tractor, motor patrol, etc., should be of the same size and make. What I mean is that if you only have a small spread of four or five trucks they should, if possible, be the same, not two or three different makes. There are some small shovels, truck cranes, tractors, trucks, compressors, and the like where the purchaser has a choice of motor power to be used in the equipment. In this case every effort should be made to have the identical make of power plant installed on as many units as possible. This will result in greatly reduced costs of warehousing, purchasing, and repairs.

Now as a contractor, I am not sure just how much of this discussion should be of value to you as representatives of local governments, because contractors are of the opinion that all construction work, repair, or maintenance of sufficient size to be definitely limited and specified should be done by contract. A contractor is positive in his statement that it is not economically possible for a politi-

cal subdivision, no matter how large, to be competitive in construction work on a day-labor basis.

### Contractor Profit Small

But, you will say, a contractor makes a profit over and above the actual cost of the work. That is supposedly true, but it is not always the case. The records of many contractors will show that the average margin of profit is very small and in the majority of cases would not be sufficient to cover the cost of the additional paper work required on a day-labor-basis job. Under our present highly competitive system, the contractor's profit is usually only the saving that he can make over the costs anticipated by his competitors, and this is due to his efficiency and ability to meet the job problems involved with better equipment, better management, or new ideas.

One of the main reasons why a contractor's cost to a highway district is less, is that each bid called for brings competitively into play the contemplated use of the best suited equipment, management, and manpower of all contractors in an area, county, or state. This in the end produces a lower cost than can possibly be obtained by simply operating government-owned equipment with government employees not motivated by profit.

On the other hand, there is no doubt as to the economic soundness of districts owning and operating sufficient equipment for the proper routine maintenance of their streets, roads, and highways; nor is there any doubt as to the necessity of ownership of snow- or ice-removal equipment in those districts so burdened. However, I sincerely question the wisdom of attempting major repairs or new construction work with these same organizations. As to routine maintenance, the only question is whether or not the proper equipment is being selected and maintained; and here the same principles apply as already mentioned for the selection of excavation equipment.

**New Gar Wood Distributors.** The following new distributors have been announced by Gar Wood Industries, Inc., Wayne, Mich.: W. L. Johnson, Midland, Tex., for dozers, scrapers and control units; Arrowhead Equipment Co., Duluth, Minn., for shovels and cranes; Jim Grady Machine Co., Macon, Ga., for shovel-cranes and Buckeye ditchers, spreaders, fluegraders and Hi-Way widening machines.

**New Euclid Distributor.** The Euclid Division, General Motors Corporation, Cleveland, O., has appointed Sierra Machinery Co., Inc., 307 Morrill Ave., Reno, Nev., distributor of Euclid earthmoving equipment in the state of Nevada.





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Last year Benton County's DOMOR Elevating Grader moved approximately 224,000 cu. yds. of material on 19 separate projects. On a recent road building job, the DOMOR was loading 5 cu. yd. trucks in 12 to 15 seconds each, for a daily average of 2,000 cu. yds.



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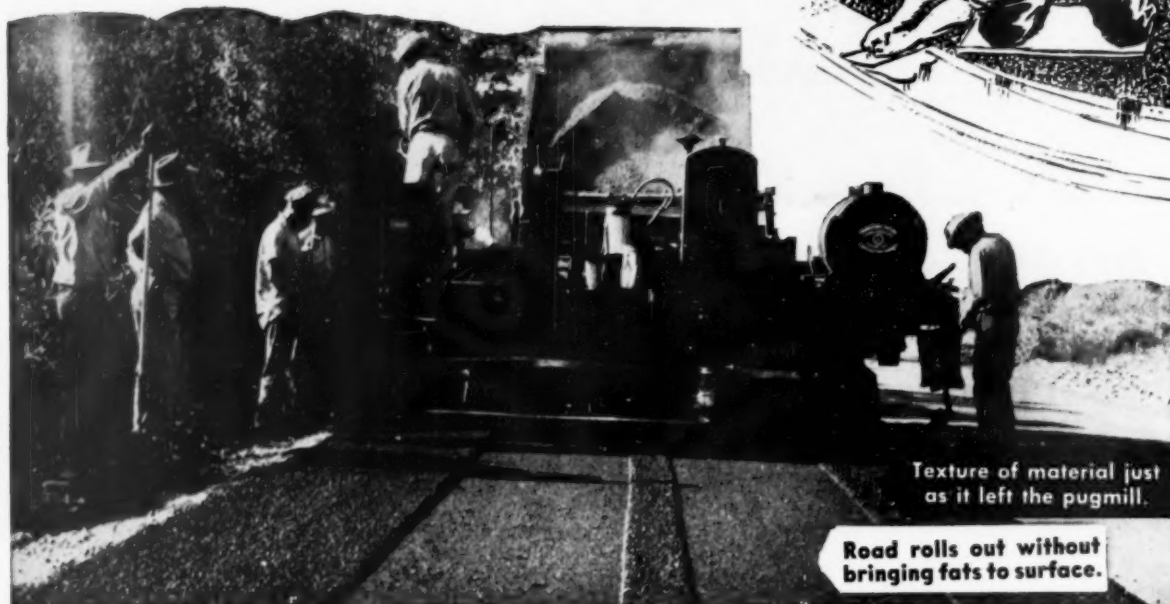
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Texture of material just as it left the pugmill.

Road rolls out without bringing fats to surface.

## —to bring fats to the surface!

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To these advantages add the Fluid Level that will assure both absolute uniformity in thickness and vastly improved uniformity in density along with a definite reduction in waste of materials now going into the hollows.

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When competitors are using "Eucs" to move dirt or rock faster and cheaper than you are, you can't afford to pass up the cost cutting advantages you get in Euclid equipment. For the recommendations of a hauling equipment specialist and a production and cost estimate on your job, get in touch with your Euclid distributor . . . there's no cost or the slightest obligation.

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**Pumps all the water a 2" hose can handle. Operates at easy speeds. Weighs only 190 lbs.**

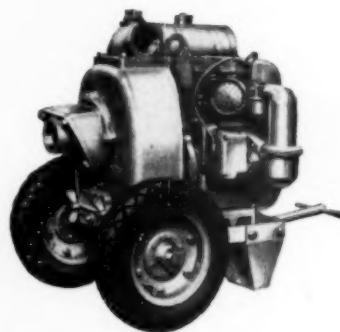
Delivering its full rated capacity of 10,000 gph when operating at only 2400 to 2550 rpm (as much as 400 rpm below the speeds of similar ordinary pumps) this Model 2PN actually pumps all the water that can be pulled through a 2" suction line under average operating conditions. 28" vacuum at the intake flange is not unusual.

Put this "Sure Prime" pump on your job and see how conservatively it has been rated, even at heads well above 100 ft. Equally remarkable, this performance is achieved by a pump that weighs only 190 lbs. on big, 13" diameter pneumatic tires, only 160 lbs. on base, and measures only 24"

x 21" x 26" high, including tires.

Doubly-sure fast priming is guaranteed by Jaeger's combination of inherent self-priming and "jet" priming — two independent, simultaneous priming actions. Powerful Wisconsin AKN engine, delivering 5.3 hp at 2500 rpm, is ideally suited to this pump. This easy speed means longer life with high efficiency maintained by Jaeger's self-cleaning shell of 20% steel, long-life Lubri-Seal on pump shaft, reversible liner plate, and an impeller adjustable for wear.

For complete information on this model and other Jaeger pumps up to 10" size, see your Jaeger distributor or send for Catalog P-10.



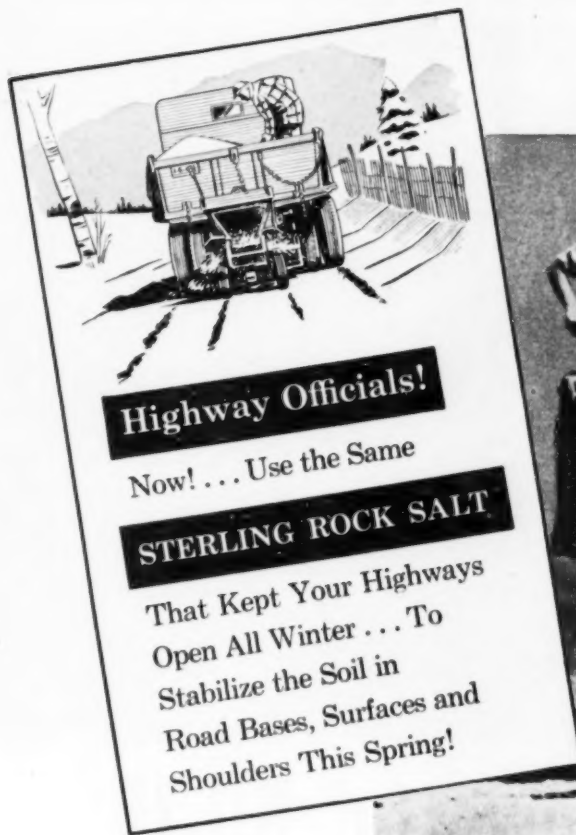
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With capacity and pressure enough for good sized pumping jobs, this Model 2PN is yet light and small enough for a plumber's work. On cushion rubber tires weighs only 180 lbs., on base only 160 lbs.

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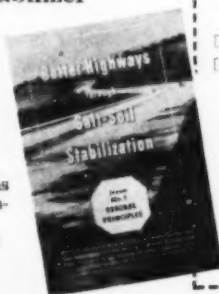
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## Transportation research at Northwestern University

The establishment of a national Transportation Center at Northwestern University was announced today by President J. Roscoe Miller. It will carry on a program of research, undergraduate training, and graduate study aimed at the solution of major problems in the highway, rail, air, pipeline and water divisions of the nation's transportation industry.

The undertaking is a joint one of the University's School of Commerce, Technological Institute, and Traffic Institute. Several other divisions of the University will also participate. An advisory committee of business and professional men interested in transportation will be formed to aid in formulating and directing activities.

The following have been appointed to the University Committee charged with the initial direction and planning of the Transportation Center: Stanley Borge, professor of transportation, and Leon A. Bosch, director of the Graduate Division, School of Commerce; Burgess H. Jennings, chairman of mechanical engineering, and Carl W. Muhlenbruch, professor of civil engineering, Technological Institute; George W. Barton, traffic engineer, and Franklin M. Kreml, director, Traffic Institute. Mr. Kreml is committee chairman.

## To move 10-story building for expressway

On of the largest building moving projects on record will be attempted this spring in Chicago, when the 60,000,000-lb., 10-story Keogh Building will be moved aside to clear the right-of-way for the Congress expressway entering the downtown area.

The reinforced concrete building will be moved 165 feet to a new concrete foundation. Special concrete foundations will be laid between the new and old location, as a support for the moving operations. As part of the preparation, this foundation will have 10 horizontal concrete beams, on a line with the building's columns.

No difference in elevation of the two building sites is involved. Twenty steel dollies, each approximately 130 feet long, will be placed on either side of each of the columns, and the rolling accomplished on 3-inch steel rollers. A pre-stressed concrete collar will be used in hooking the dollies to the individual columns. The 60 columns will then be cut below the collar line so that each rests on a steel dolly. Synchronized hydraulic jacks pressing against the dollies will perform the actual moving.

The \$1,200,000 job was planned by Samuel Shatten and details were worked out by Ralph Friedman of Friedman, Alschuler & Sincere.

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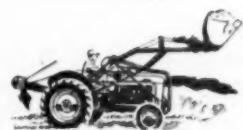
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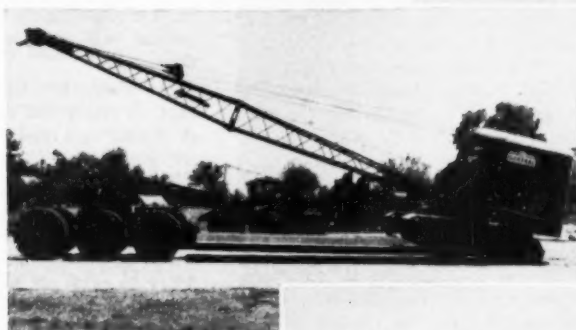
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## Wet Weather Needn't Always STOP YOUR EQUIPMENT

**I**NCLEMENT weather is one of the most important factors contributing to down-time of heavy equipment, note Le Tourneau-Westinghouse engineers. Heavy earthmoving equipment down for weather spells decreases production and increases costs and can be the deciding factor as to whether the contractor makes or loses money on his job.

Even small amounts of rain can force the contractor to cut his shifts. Continued rainfall over extended periods of time can temporarily close down the job or cause the contractor to quit work entirely until underfoot conditions are dry enough to allow reasonable progress of work.

There are, however, several things the equipment operator can do to reduce weather down-time and keep his equipment rolling throughout the rainy season.

- **Maintain Haul Roads.** In preparation for short wet spells or prolonged rainy weather, keep the haul road smooth. Use the dozer or scraper to fill in large holes or pockets that will

temporarily hold or impound water. Assure good drainage through the construction of adequate ditches and culverts. Keep constructed ditches and culverts clear of weeds, rocks, debris, and other obstructions.

- **Keep Pits Dry.** Watch your drainage in the borrow area. Load downhill in the direction of lines of natural drainage. Keep the borrow area free of pockets or low spots that encourage ponding. Eliminate ruts by smoothing the borrow pit or by leaving the borrow for the haul roads over different routes of travel.

### Keep Cut Solid

- **Don't Root Too Far Ahead.** Rooters are useful for securing bigger loads in the borrow or cut area. If conditions are wet, or if it looks like rain, don't root material too far ahead of the scrapers. Keep the area as solid as possible. Loose, rooted areas absorb water rapidly and get too wet to work. Settle for smaller loads rather than shutting down entirely.

- **Crown Your Fills.** Keep the fill compacted as solidly as practicable. Do

this by spreading the loads in thin, even layers. Compact by changing the path of travel of each load. For proper fill construction, build the fill so it's high on the shoulders and low in the center. During wet season it's a good idea to level the fill and give it some crown for drainage at the end of the shift. Following the proper procedures before rain can save a lot of job down-time.

If working in rough, hill country it's easy to cut a few ditches with dozer or grader and thus keep water off the cut and fill.

- **Skim Off Mud.** Start back to work earlier after a heavy rain by putting available dozers to work a few hours ahead of other equipment. Use the dozer to skim off mud, drain and fill water holes and ponds. If there is a penalty existing against the job completion date you can get to work faster by wasting, stockpiling or spreading out to dry, mud or materials too wet to go on the fill. This material, if worth saving, can be picked up later a little at a time along with drier material. By doing this,



• With modern equipment it's easy to peel away the mud layer.

too much wet material won't be placed in the fill at any one time.

• **Sand on Road.** Where showers have wet the top inch or so of the haul road, making it dangerous for rubber-tired units to work at top speed, pick up a load of sand or cinders or get some dry material out of the cut or borrow area and spread a thin layer over the haul road. If the haul road is too long to make this method practicable or wetness has penetrated three or four inches below the surface, it can be scraped off with Tournapulls and scrapers. Heavy grades on the average construction road get slippery faster and stay slippery longer. For best performance, reduce grades to a minimum. Slippage decreases travel speed, reduces the size of load carried, makes for hazardous operation and can shut down the job altogether. Eliminate slippage and get top speed and higher yardage.

#### Good Tire Flotation

• **Watch Tire Pressures.** Adjust tire pressures within recommended load carrying limits for best job operation. Lower air pressure and reduced speed can be used where underfoot conditions are soft, spongy and rubbery to extended depths, and where flotation would be of first consideration. Use higher tire pressures to cut through shallow mud to get to firmer footing.

#### French Legion of Honor to Budd and Magennis

At the annual board meeting of the International Board Federation in New York, the French Legion of Honor was presented to two IRF directors by the Honorable Jean de Legarde, Consul General of France.

The recipients were Burton C. Budd of New York, Vice President, Packard Motor Car Company, and Frank T. Magennis, Akron, Ohio, Vice President, Goodyear Tire and Rubber Export Company. The awards were in recognition of contributions made by each, as Federation chairmen, to highway development in France.

The IRF is a service organization for national good roads associations in some 47 countries throughout the world. The Federation offices are in Washington, London and Paris.

The rising volume of highway construction throughout all parts of the world was spotlighted at the IRF meeting. The road work in many countries continued at record-breaking levels in nineteen fifty-three, with indications of further increases in the forthcoming year according to Robert O. Swain, executive director of the Federation.

#### Two examples of safe signing practice in Virginia



- (Upper Scene): How drivers entering or leaving an arterial highway at a local road junction are warned. Standard practice in Virginia is to locate sign post in the center of the side road, so the driver approaching the arterial is confronted with a conspicuous reminder to stop before entering the main traffic stream.
- (Lower Scene): Yellow and black striped warning panels are posted at bridge and culvert headwalls along U.S. 1, very heavily traveled Washington-Richmond route. Even where railing or endwalls are well beyond pavement edge, this warning is considered important.

#### Ohio legislature approves \$240 million 2-yr. program

A \$240 million highway construction program in the next two years is insured for Ohio aside from turnpike construction, which itself is booming. The legislature at a brief special session in January set up the mechanics by which the \$500 million in highway bonds authorized by the voters last November can be issued, and took other action recommended by Governor Frank J. Lausche.

Although the bond issue can legally be floated at the rate of \$125 million annually, the Ohio assembly decided to hold the issuance of bonds to \$82 million annually in 1954 and 1955. No highway revenues will go into the bond retirement fund until July 1, 1955, thus in effect keeping the state

on a modified pay-as-you-go plan for the next eighteen months.

This recent action pertains to the 6,500 mile arterial system selected for improvement under the bond program, in addition to regular state highway funds accruing from taxation.

Including turnpikes Ohio has \$1,700,000,000 in highway construction revenues in sight for the next eight years, a figure considered to be a state record. Contracts totaling \$211 million are in force on the turnpike.

The Governor stressed the importance of an even flow of funds during this period, limited to not exceeding \$260 million annually including turnpike outlays. This even pace rather than a faster temporary pace was recommended because a boom would tend to inflate prices of road work.



## Move a Mountain



## or Push Some Pebbles

Whatever the job, there's a SHUNK blade designed to do it efficiently and economically. For almost a century SHUNK has been manufacturing a full line of fine cutting edges rolled from top-quality steel to fill any maintenance or construction need . . . whether it's gravel, dirt, shale, snow or rocks.

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**3,000 DIFFERENT SPECIFICATIONS**



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BULLDOZER BLADES



# Shunk MANUFACTURING COMPANY

*In Our 99th Year*

**BEST BLADES MADE**

## Legal

### Damage Caused by Surface Water

By Albert Woodruff Gray

A drainage ditch was dug at the side of a South Dakota highway for draining water from the road bed. The ditch paralleled the road to the foot of a hill permitting the drainage water to spread across the adjacent land.

The owner of the land sued the county for damages from this overflow and the county maintained in its defense that any damages were covered by the compensation received by the land owner when the right of way for the road and ditch had been acquired.

In sustaining this claim for damages the South Dakota court said,

"Flowing is clearly established as an invasion of property rights and as compensable injury. Intimately connected with the question of consequential injuries is the one as to how far the damages for the injury done by the surface water in the improvement of the highway are included in the compensation made for the right of way.

"Such compensation includes all injury which may be contemplated as likely to result from the proper and careful performance of the work of improving the highway. It will include all damages which may result from the change of grade of the highway in the proper and skillful performance of the work.

"But the right to open and improve a highway does not include the right to use it as a water course nor to gather together water and fail to take care of it. Therefore damages for such acts cannot be presumed to have been within the contemplation of the parties when the compensation for laying out the highway was made. We believe it is sound principle to permit recovery for a temporary taking such as has occurred here through the flooding of the premises."

*Bogue v. Clay County,*  
60 N.W. 2d 218, South Dakota

Constitutionality of Wisconsin's new toll road enabling act was upheld by the State Supreme Court. Enacted by the 1953 legislature, the law provides for the creation of the State Turnpike Commission to study and construct, if found feasible, a cross-state toll highway running from the Minnesota to the Illinois border.



## Legal

# Title to Street Held in Trust

By Albert Woodruff Gray

The owner of land in the suburbs of Oklahoma City conveyed to the city two lots, providing in the deed, "Said lots are to be used for street purposes only, it being the intention of this deed to devote said lots to these purposes as fully and to the same effect as if said street had been marked and designated by the original plat."

This land was used as a street for 22 years, when the street was abandoned under a city ordinance and a quit claim deed made to a resident of that city. As a consequence a lawsuit was brought by the users of the street for an injunction against enclosing this land and withdrawing it from public use as a street. The Supreme Court of that state sustained an injunction against the withdrawal of this land from use as a street, saying,

"The deed to Oklahoma City conveyed the entire fee title but because the property was conveyed for street purposes the city became the owner in trust for the public, not in a proprietary capacity. Upon vacation of the street the land attached to the adjacent lots and the city then owned nothing which could pass by quit claim deed to the grantee, even if it had authority to convey which it did not.

"The city could not by vacating the property as a street destroy the rights of the individuals to use the same if those rights had accrued or were inherent in the ownership of the adjacent lots.

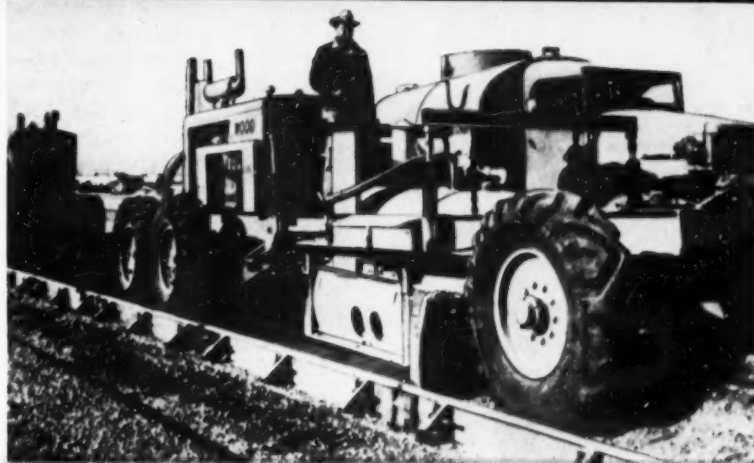
"The diversion of public property to private use is generally considered an abuse of power by those who are custodians of the rights of the public, rendering the act void."

*Lindauer v. Hill, 262 Pac. 2d 697, Oklahoma, May 5, 1953.*

A bill to relieve the contractor of liability and make the state responsible for injuries incurred when road projects are opened to traffic before completion, has been sought in the Massachusetts legislature. The measure is sponsored by the New England Road Builders Association.

## MODEL 42 ROADMIXER

*helps beat schedule on  
Los Angeles Harbor Freeway*



More than 660,000 square feet of sub-base material was cement-treated by a Model 42 Roadmixer, owned by J. E. Haddock, Ltd., on the 1.09-mile strip of the Los Angeles Freeway System. J. E. Haddock and Oberg Bros. Construction Co., who also own a Model 42 Roadmixer, were contractors for this extension.

Mechanized techniques, such as this, opened the Harbor Freeway almost 60 days ahead of schedule.

The Los Angeles Freeway System is one of the largest projects of its kind in construction history—and approximately 95% of the soil-cement base stabilization has been mixed with Pettibone Wood Roadmixers.

On roads, streets and highways Roadmixers are setting new records of speed, production and economy for mix-in-place base stabilization, either soil-cement or bituminous, as well as on asphalt wearing surfaces for secondary or farm-to-market roads.

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**SPREADER BOX**—Attached in 30 seconds to a dump truck, the Pettibone Wood Spreader Box measures and forms materials into accurately proportioned windrows as the truck moves along. Windrow capacities of 2 to 8 cu. ft. are quickly and easily controlled by adjustable tailgate. The Pettibone Wood Spreader Box eliminates guesswork in measuring imported materials placed on sub-grades or bases.

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GALION MODEL 700 hydraulic hoist with steel sub-frame, ideal for loads of 6½ to 8½ tons.

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Two 180-inch diameter Toncan Sectional Plate Pipes, 270 feet long, were installed under 35 feet of fill at Dummerston, Vermont, during relocation of U. S. Route 5.

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Even big jobs like this Toncan Sectional Plate Pipe installation are easy to handle . . . easy to erect in any weather with unskilled labor.

A single order covers all required materials—bolts, nuts, washers, and pre-cut, pre-punched Toncan Sectional Plates. The galvanized bolts feature a combination head and convex washer forged to fit the valley of the corrugation and provide full bearing on the plate. A special galvanized concave washer is used under the galvanized hex nut on the crest of the corrugation. This assures uniform bearing and prevents gouging or scraping of the galvanizing on the plates.

Once in place, you can forget about Toncan Sectional Plate Structures. They flex with shifts in subsoil and fills, maintain their original water-carrying capacity, do not spall.

Toncan Sectional Plate Structures give you years

of trouble-free service because they are made of Republic Toncan Iron . . . containing twice as much copper as ordinary copper-bearing steels and irons plus just the right amount of molybdenum to make the copper most effective in resisting rust.

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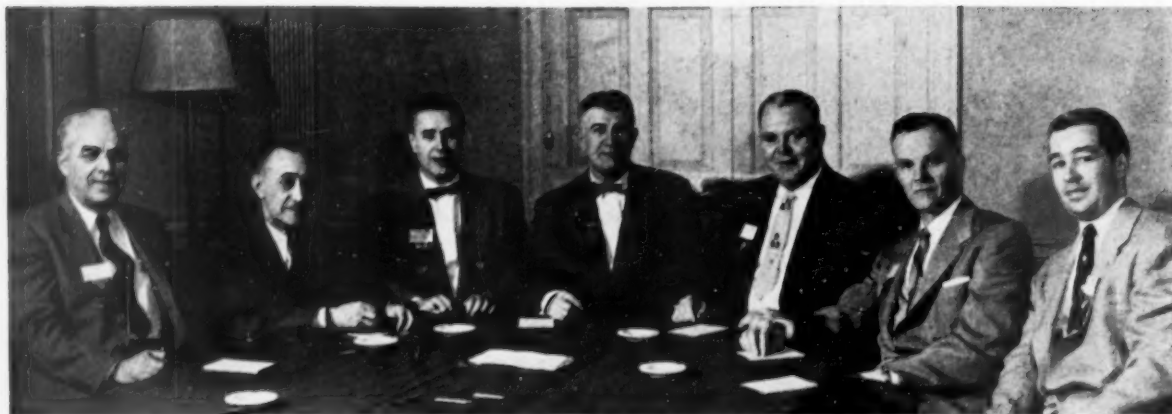
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• Newly Elected 1954 AED Executive Committee: S. F. Laskey (Northwestern Equipment, Inc., Fargo, N. D.), vice president; R. S. Hamilton (Sheridan Equipment Co., Ltd., Toronto), vice president; R. J. Finn (Bode-Finn Co., Cincinnati), executive vice-president; George W. Gagel (Machinery & Supplies Co., Kansas City, Mo.) president; F. J. Fitzpatrick (Parker-Danner Company, Hyde Park, Mass.), treasurer; L. Miner Doolen (Telford Equipment, Inc., Lansing, Mich.), vice president, and P. D. Hermann, AED, executive secretary.

## Distributors See "10 Year Backlog"

*Good long-pull outlook, and need to build better sales and service organization, among many topics discussed by AED members at the Waldorf.*

OVER 2,500 strong, the construction equipment dealers and manufacturers met in New York Jan. 31-Feb. 4 for the 35th annual meeting of the Associated Equipment Distributors. "Building Sales and Cutting Costs in 1954" was the theme of a week-long series of conferences and business sessions.

The need for greater effort to build up quality sales organizations was voiced by retiring president S. John Oechsle, who said there must be a closer understanding between manufacturers and distributors of the problems involved in the distribution of construction equipment.

Commenting candidly on the recent stiffening of business, Oechsle said, "The year 1953 was one of many changes in our industry, including an unusual number of mergers among our suppliers. The end is not in sight. The impact of these changes has been severe on many organizations in our industry, and it is a trend that every member must watch closely. . . . In the past few years the dealer's cost of doing business has risen considerably, and I feel that now is the time to take a fresh and objective look at

our sales force and all other personnel—in terms of company needs and economic capacity to carry on.

Concluding his remarks, in which contractors and road people generally have a keen sideline interest, this speaker concluded by saying, "Our industry is fortunate in having what I believe to be at least a ten-year backlog. By this I mean that the building of roads, schools, bridges, hospitals, etc., etc., is ten years behind present-day requirements. There should be a good demand for construction equipment and services, and it is up to both distributor and manufacturer to meet this demand with sound sales and service policies."

### Must Watch Costs

One meeting session was devoted to methods of cutting dealer business costs. Norris Perris, one of a panel of management consultants, noted that the costs of distribution in any field are usually reduced through the medium of better sales planning and profit control. Pointing to the importance of market research by the dealers, he said "it is the ability to know your market, and plan for it, which cuts distribution cost more than any

other single factor." There must be a limit on free service, this speaker added, using charts and statistics to make his point.

Another specialist, Leo Cherne, president of the Research Institute of America, said that good times were not over and took some of those present to task for a lack of faith in free enterprise and the business future.

Al N. Seares, vice president of Remington-Rand, also counseling on business philosophy, illustrated the sales weaknesses and corrective methods of typical business organizations. He noted the trend toward higher distribution costs in the past decade, saying that managers must ferret out the waste.

Honorary membership in A.E.D.



• AED's retiring president S. John Oechsle (left), Metalweld, Inc., Philadelphia, Pa., shakes hands with the new president George W. Gagel, Machinery & Supplies Co., Kansas City, Mo.

was conferred upon Past-President Julian S. Gilman, recently retired vice-president and secretary of Wm. H. Ziegler Co., Inc., Minneapolis, Minn., and a certificate of distinguished service was presented to Past-President Morton R. Hunter Sr., president of Hunter Tractor & Machinery Co., Milwaukee, Wis., one of the founders of the association. The special hand stamped leather plaques were presented by retiring president Oechsle on behalf of the entire membership.

In a brief message to the membership following his installation as President, George W. Gagel named some general goals toward which the association would work during the coming year. Among these were:

- Continued expansion of services to the industry, provided through the association's executive office.
- Continuation and expansion of the statistical research program initiated two years ago.
- Expanded work in the fields of customer-distributor and manufacturer-distributor relations.

A "Manufacturers' Day" session, sponsored by A.E.D. manufacturer members, consisted of a panel discussion on "Meeting Today's Sales and Cost Reduction Problems," composed of four manufacturer and four distributor members.

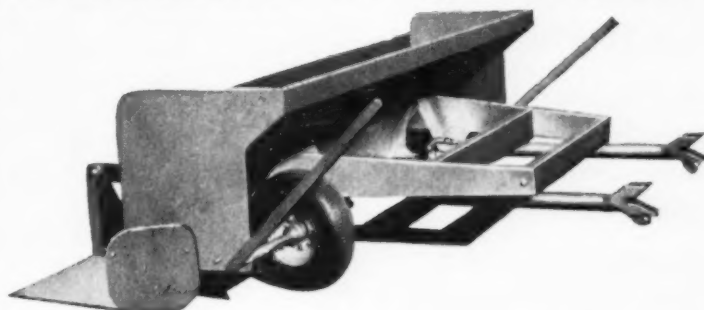
Dr. Harold H. Maynard of Ohio State University moderated the discussion. Distributor participants included A. Ashley Carroll, of Eastern Equipment Sales, Inc., Springfield, Mass.; Walter W. Kershaw, Wheeler-Kershaw Company, Salt Lake City, Utah; I. R. Kraemer, Buran Equipment Company, Oakland, Calif.; and John J. Stockberger of Stockberger Machinery, Inc., Fort Wayne, Ind. Manufacturer panel members were J. L. Beltz, The Thew Shovel Company; L. W. Glaser, Littleford Brothers, Inc.; G. M. Just, International Harvester Company; and L. E. McDonald, Bucyrus-Erie Company; C. J. Haring, J. D. Adams Mfg. Co. was chairman of the session.

A.E.D.'s 35th Annual Meeting concluded with a Farewell Luncheon, with Julian R. Steelman, president of the Koehring Company, as toastmaster.

### A.E.D.'s New Officers

George W. Gagel, president of Machinery & Supplies Co., Inc., 2000 Walnut Street, Kansas City, Missouri, was installed as 1954 President of A.E.D. He succeeds retiring President S. John Oechsle, president of Metalweld, Inc., Philadelphia, Pa.

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**UNBEATABLE** for Driveways, Parking Lots, Light Traffic Roads and Streets. Speeds up all paving jobs—base and top. Self-leveling action on any base contour. Cuts hand labor costs 90%. Spreads ½" to 8" thickness. Max. capacity 1 ton per min. Highly portable—carried by tail-gate hooks.

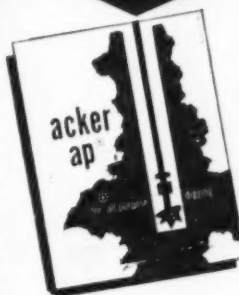
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Send the coupon today for your copy of our new catalog showing the wide range of application as well as the many exclusive features that make the Acker All-Purpose Digger the most versatile and useful you can buy!

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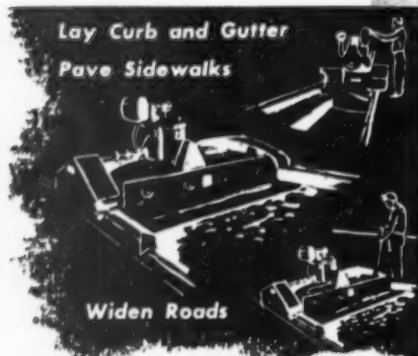
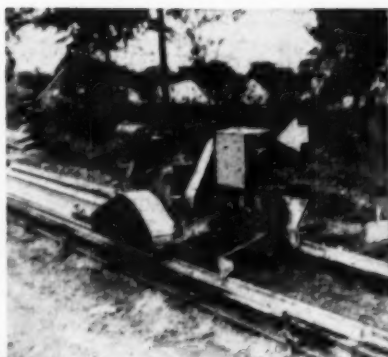
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for DOTMAR CURB,  
GUTTER, SIDEWALK, PAVER

Further Speeds Paving . . .  
Eliminates Hand Tamping  
Readily attached to  
existing machines.



## It's Actually 3 Machines In 1 !

Contractors everywhere are boosting production, saving time, cutting costs, with Dotmar Curb and Gutter Pavers. Paves 5 to 10 lineal ft. per min. Lays any shape curb and gutter, and sidewalks up to 60" wide, or integral, curb, gutter and sidewalk simultaneously. Tamps concrete ahead of screed. Pays for itself in first mile of curb and gutter paved. No face forms to set in curb work. Self-powered—as few as 3 men can operate. Send for Bulletin

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• George W. Gagel, new AED head.

Mr. Gagel's election climaxes his rise through a succession of AED executive positions. During 1953, he served as executive vice-president and member of the Insurance Trust. He has been a board member since 1952, and has served two terms as director of Region IX (Kansas, Nebraska, Iowa and Missouri). Mr. Gagel has also been chairman of the planning and promotions committee, and was twice president of the Equipment Distributors Association of Greater Kansas City. Mr. Gagel has been associated with Machinery & Supplies Co., Inc., since 1939.

Other officers elected at the AED Annual Meeting include: R. J. Finn, Bode-Finn Co., Cincinnati, Ohio, executive vice-president; S. F. Laskey, Northwestern Equipment Co., Fargo, N. D., vice-president; L. M. Doolen, Telford Equipment Co., Lansing, Mich., vice-president; R. S. Hamilton, Sheridan Equipment Co., Ltd., Toronto, Canada, vice-president; and F. J. Fitzpatrick, Parker-Danner Co., Hyde Park, Mass., treasurer.

## Letter to the Editor

To the Editor

Just a personal note of appreciation on my article [How to Start a Driveway Business Without a College Education; R.&S. Nov. '53]. I would like to have about 15 copies. A few for my family, some for the boys, a few friends, etc.

We just landed three more nice jobs. A \$4,000 new sub-division road, a \$7,200 parking lot for Sears, and \$2,420 parking lot for the new Supreme Court here.

W. D. Hunt, Manager  
Cherokee Asphalt Paving Company  
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FROM ONE SOURCE  
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Blends with color of concrete. For use in architectural concrete structures such as bridges, viaducts, etc., where black color of ordinary fillers would be objectionable. Fully resilient—non-extruding.



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High recovery factor (95%) after compression, non-extruding qualities and light color make Cork Joint Filler ideal for use in flood walls, outlet works and spillways, sewage treatment plants, filtration plants and bridge construction.

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## More and Broader Research

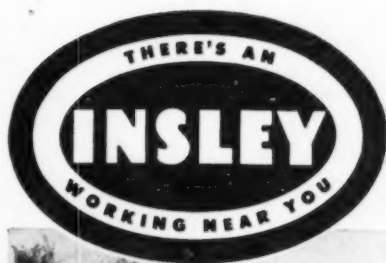
**T**HE relatively small amount of research money being invested to improve highways, compared with the lavish research budgets of the big auto makers, was cited recently by ex-commissioner of Public Roads, Thos. H. MacDonald. This gentleman, who is supposed to be at retirement age, is remarkably active, down in Texas, where he has helped set up a long-range research program under Texas A & M College and the highway department.

Speaking at the recent A & M highway short course—an outstanding annual affair—he took his sermon from a current popular magazine article, "They Sink Fortunes in Auto Tests." This article told of the "intelligent mal-treatment" given test models at the manufacturers' proving grounds, so that we can have better cars and trucks each passing year. Even before reaching the test grounds, much research has gone into the evolution of the automotive products. MacDonald noted that the policy of constructive research is an outstanding characteristic of all major industries which have grown rapidly and have expanded their operations.

"We are concerned here with the impact of automotive research on the highway situation," he continued, noting that the results of this research have "brought the house down around our ears" in the highway engineering field. The great increase in vehicle registration (54,700,000 for 1953) is the most commonly assigned cause of our highway inadequacy. This is true only in special situations. Our highways suffer greater obsolescence and depreciation through changes in the way we use motor vehicles. These changes have been brought about by research that has been unceasingly applied to vehicle design and production.

These changes in use pertain particularly to the rural road and of course center chiefly around greater speeds. Urban congestion, too, is a product of change brought about by the improvement in the vehicle—population shifts, decentralization, rapid industry growth, spilling of central populations upon the city periphery, etc.

MacDonald suggests intensified research in the road not as an engineering structure but as a transportation medium. Particular emphasis is needed on the economic, legal and financing phase. There is need for more large-scale projects such as test roads, which are necessarily costly but can be financed as cooperative enterprises by the interested agencies.



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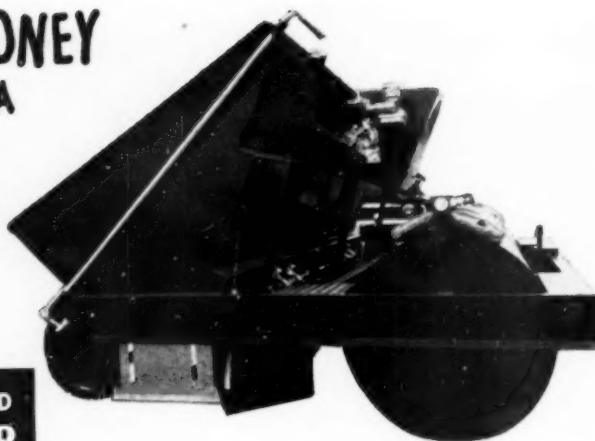
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# West Virginia Turnpike Nears Paving Stage

*Addition of \$37,000,000 bond financing assures completion of 88-mile toll road. Contractors have completed most of 31,000,000 cu. yd. grading job, increased by heavy slides and design changes. Design modifications made to ease curves, widen cuts and fills and give additional lane capacity to more miles of the turnpike.*

**R**ECENT weeks were eventful for West Virginia Turnpike, which is scheduled to open to traffic August 1 with good breaks in the weather.

Bankers underwrote an additional \$37 million in revenue bonds, bringing to \$133 million the bonds issued for the 88-mile mountain road project.

Coverdale & Colpitts, traffic consultants, in a resurvey increased the toll revenue predictions for this road by 33 per cent.

The grading contractors pushed ahead on rock excavation and filling, one outfit moving 85,000 cu. yd. per week of clear weather—a remarkable wintertime accomplishment.

Bridge steel was being set at two-score locations.

And base rock was being crushed and stockpiled at the rate of 20,000 tons daily at five special plant set-ups.\*

To aid in placing 1,600,000 sq. yd. of 9-in. portland cement concrete pavement in four months, cement producers agreed to furnish tested steel storage bins for a third or more of the season's 2,400,000 barrel need, and to keep at least two weeks ahead of the pavers at all times. (Four paving contracts ranging from 16 to 30 miles each were awarded in late autumn).

Much discussion has centered on two phases of the turnpike work to date. These are the added cost over the original estimate and the design evolution since the original financing. The job will cost a probable \$111 million instead of \$78.8 million first estimated, a \$32.2 million increase, these figures being for construction, right of way, engineering and contingencies but without financing cost or interest

\*Separate field report to be published in forthcoming issue of Roads and Streets.

during construction. Contracts in force on January 1 totaled \$87,139,000 or about 95 per cent of the \$92,097,000 estimated construction cost.

The increase in cost as reviewed by Howard, Needles, Tammen & Bergendoff, the general consultants, is in

part due to logical design developments, and in part to economic and legal developments that were not predictable at the time of the 1951 estimate. The road was originally ordered by the turnpike commission as a dual highway. The high construction costs that shaped up, together with the modest traffic volume first predicted, led the commission in 1951 to plan the construction in stages. The first step, for which the original \$96 million in bonds were sold, was to build the major portion of a dualized system, initially having only two lanes of paving plus creeper lanes on

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some hills and dualization at certain heavy traffic points. The Commission was also charged, under the initial Trust Agreement with the bond houses, with providing all reasonable safety facilities. The agreement however was not specific as to how high the design standards should eventually be, thus giving the commission and its engineers considerable leeway in ultimate design. Minimum immediate requirements were set forth, based on the limited design information then available. Every effort was made at that time, however, to establish

line and grade details as the basic elements of the turnpike engineering.

Subsequently, after the initial financing furnished the necessary funds, the commission through its consultants was able to make a more extensive and time-consuming survey and design analysis, to determine the best possible and economic specific characteristics of the system. The two requirements of economic feasibility and of design standards were often at odds.

However, the greatest single element of added unforeseen cost was

the high bid prices on the excavation, the earthwork going at a weighted average of \$1.30 as against \$.65 estimated. The bidding was delayed by the state Supreme Court decision on the feasibility of the presently constituted partial turnpike, and this delay had the unfortunate effect of throwing the bidding schedule into a period when contractors were also considering jobs on the New York Thruway, Ohio Turnpike, large dams in the region, and other competitive work. This circumstance plus the shortened schedule, gave the Commission the choice of putting off the project (and paying higher interest charges) or going ahead at the prices it could get.

As a result of this further study, noteworthy changes in design and procedure have taken place since the original financing, all aimed at providing a better and more productive highway. The more important of these:

- The road is planned to be extended approximately 10 miles south from its present terminus near Princeton, to the Virginia line.
- Along scenic Paint Creek 30 miles south of Charleston, further study developed the feasibility of eventual dualization within the valley floor, instead of a more costly second roadway in a parallel valley.
- All real estate required for eventual dualization is being obtained now, at a saving over future cost.

#### Dualization Anticipated

- Excess yardage from many large cuts is being used to widen adjacent fills. Certain cuts are being built wide enough for dualization, where widening of the cut later under traffic would be hazardous. About 26 miles, in all, will thus be fully graded for a dual roadway.
- Immediate dualization including pavement is planned for a total of six miles of turnpike at or near interchanges and service area, where needed to minimize traffic interruptions, attract traffic and save future higher cost of such dualization. All relocations of highways, streams and utilities are also being constructed for an ultimate 4-lane turnpike.
- The two initial 12-ft. traffic lanes and heavily paved 9-ft. shoulders are to be utilized as a 4-lane system; slow traffic (trucks) will use the shoulders, under critical traffic conditions.
- The initial crawler lane mileage for trucks on hills is increased, these to consist of a 12-ft. concrete lane on one or both sides of the main roadway approaching summits. Peak capacity of

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the system has thus been considerably increased at a cost increase of from 1 to 2 per cent.

- Extra grade width is also provided for future creeper lanes (totaling 11 miles), added grading done to save structure or real estate cost, and changes adopted in the difficult Paint Creek bed location, following more complete contour mapping and study.
- Curves in many instances have been eased to a longer radius, and minor location changes made since inception, which together have cut nearly a mile off the turnpike length.
- Steel instead of wood guard rail posts have been adopted as standard.
- One additional interchange is planned, and the design of another interchange stepped up to increase its traffic capacity.
- The Commission regards its selection of portland cement concrete (at \$4 million added first cost over asphalt) as a means of assuring a heavy-duty, skid-resistant, long-life pavement with low maintenance.

The foregoing have contributed to the added construction cost, requiring among other things an increase in grading quantities of about 3,500,000 cu. yd. Another 3,000,000 cu. yd. of excavation has been necessitated by slides, nearly half of which occurred in one 9-mile contract (that of Morrison-Knudsen Co. and Ralph E. Mills, Inc.; Contract 27). Excavation of all kinds is expected to be 31,000,000 cu. yd.

### Irregular Kentucky bids cause rejections

Irregular and unbalanced bidding at the Kentucky state letting held October 23, 1953, proved costly to some of the interested contractors, according to a report in "The Scrap-er."

In one instance the apparent low bidder submitted a bid on reinforcing steel of \$12.00 per pound when obviously he intended to bid 12 cents on the item. As a result the entire job was rejected.

On another project the apparent low bidder failed to bid on the minor item of water. His bid was considered irregular and all bids on the project were rejected.

Other unbalanced bids noted that did not affect the low bidder were:

On one project no bid on the surfacing items.

Two bidders bid the item of water at \$10.00 per 100-gallons when they probably intended to bid 10 cents per 100-gallons. That might be open to question, though, as "water has gotten to be a right high-priced item in a lot of areas," notes this publication of the Kentucky Contractors' Association.

### Truck lights held accident cause

Trucks equipped with "will o' the wisp" lights that glow and fade are held responsible for many of the traffic fatalities which have occurred on the New Jersey Parkway. Charles M. Noble, chief engineer of the Turnpike Authority, estimates that at least 53% of fatal rear-end collisions on the highway involved motorists who ran into trucks at night. Many of these drivers were from out of state. Mr. Noble has urged immediate action to reduce the perils attributed to sub-standard illumination

on commercial carriers.

The rear light candle power on many trucks averages less than that for passenger cars, he notes, and on some types of commercial carriers the electrical connections are faulty.

Mr. Noble suggests remedies:

Increased brightness of truck tail lights to a uniform brilliance, preferably 7 to 10 candle power such as on modern passenger cars.

Install tail lights at a uniform height above the roadway.

Adopt a standard lighting pattern.

Put warning device in truck cab to tell driver when tail lights are not operating.



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# Batch-Truck Dumping

## Delays on Paving Jobs

Committee Report Number 26, December, 1953, Special Committee on Highway Equipment, Highway Research Board.

The average time for batch trucks to dump a batch in the skip of a 34-E dual-drum paver varies between jobs by more than 350 per cent. Where dumping time is excessive, delays to the paver may be substantial. On

some portland-cement-concrete paving jobs such delays have averaged better than an hour in each 10-hr. work day.

Data on the dumping time of batch trucks were obtained from studies conducted by the Production Cost

Jobs	Average time to dump one batch in the skip sec.	Average "skip-down" time available for dumping one batch in the skip (item 2), without delay to paver sec.
Group A—the 3 jobs where trucks took the least time to dump their batches	7.4	10.8
Group B—the 3 jobs where trucks took the most time to dump their batches	26.6	19.8

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Unit of the Bureau of Public Roads. These studies were made over the past 5 years on 12 paving jobs selected at random. Over 21,000 batch dumpings were timed for 14 different 34-E dual-drum pavers.

The time available for dumping of the batch trucks, "skip-down" time, is dependent on the paver cycle time for which the batchmeter is set. This time varies from job to job. Unless dumping maneuvers are completed within this skip-down time the paver will be delayed. These truck maneuvers are:

1. *Backing Onto the Skip.* This maneuver starts when the skip hits the ground and ends when the waiting batch truck is backed up to a point where its bed obstructs the skip.

2. *Dumping the Batch.* This maneuver starts when the bed of the truck obstructs the skip and ends when the truck is again clear of the skip, after dumping its batch.

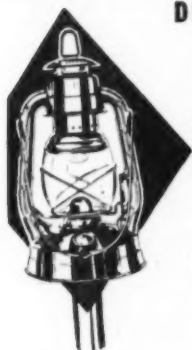
The average time required to back onto the skip (Item 1) was about 3.5 sec. for all jobs combined. On individual jobs variations of 1.5 sec., either greater or less than the average, were observed.

With respect to dumping the batch (Item 2) there were wide variations among the individual jobs. An indication of the extent of these variations is obtained by comparing the three jobs (Group A jobs) having the least dumping time per batch with the three jobs (Group B jobs) having the most dumping time per batch. Of the Group A jobs, two had four-batch trucks, and one had two-batch trucks. Of the Group B jobs, one had four-batch trucks, one had both two- and three-batch trucks, and one had two-batch trucks.

Because of differences in paver cycles, the Group A jobs had 9 sec. less skip-down time available for dumping than did the Group B jobs. This handicap was overcome, however, by more-rapid batch dumping. On the average the trucks on Group A jobs dumped each batch in less than a third of the time taken on the Group B jobs. On the Group B jobs, the average time to dump one batch exceeded the skip-down time by 6.8



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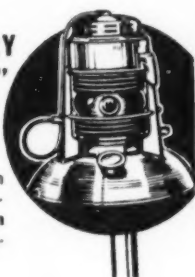


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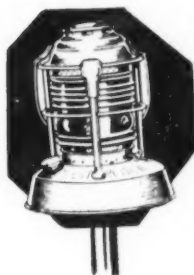
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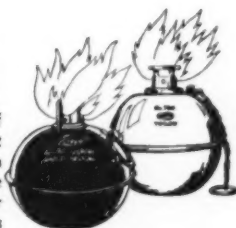
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sec. The total of such delays amount to 10 per cent or more of the working time on some jobs.

Field observations indicated no noticeable difference in the exercise of good safety practice among the various jobs. Thus, if the batch dumping time on Group A jobs is considered as a reasonable standard of performance, it is apparent that excessive and constantly recurring delays caused by slow dumping of the batch can be reduced in many cases. Use of suitably designed batch trucks, hoisting of the body in readiness for backing onto the skip, coaching of truck drivers, and hiring of a capable dumpman (or spotter) to direct the batch trucks in their dumping maneuvers will pay dividends in keeping paver delays from such causes to a minimum.

## Questionnaire on landslides

The Committee on Landslide Investigations, Highway Research Board request help in compiling a volume on "Landslides and engineering practice." This volume, which has been in preparation for two years, is designed primarily for the use of highway and railroad engineers but it is hoped that it will be useful to all engineers and geologists whose work concerns landslides in any way.

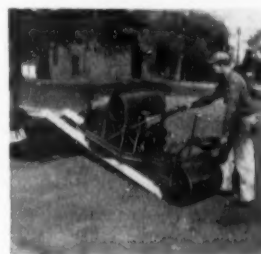
To make the work as comprehensive as possible the committee has designed a questionnaire covering all phases of the subject from economics to prevention and correction of slides. This questionnaire is now being sent to all highway departments and to several other interested groups. The committee earnestly requests additional facts from all engineers and geologists, whether they have data on one or many slides and whether their information is general or specific. Requests for copies of the questionnaire, or for further information, should be addressed to Seward E. Horner, Chief Geologist, State Highway Commission of Kansas, Topeka, Kansas.

Bairstow New District Sales Manager. Robert W. Bairstow, formerly district sales representative for American Chain & Cable Co., has been named Southeastern District sales manager for The Thew Shovel Co., Lorain, O. He will be responsible for sales in the states of Georgia, Florida, North and South Carolina and eastern Tennessee. He succeeds D. W. Savage, who has become Federal District Sales Manager at Washington, D. C.

Powers Joins Koehring. H. R. Powers has been named general manager of Koehring Co. of California, Stockton, Calif., the parent firm, Koehring Co., Milwaukee, Wis., has announced. Mr. Powers was domestic sales manager of the LeTourneau-Westinghouse Co., Peoria, Ill., prior to accepting the post.

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## An equipment distributor speaks on trade-ins

Round condemnation of the practice of granting excessive trade-in allowances to help sales of new equipment is the author's theme. A distributor himself, he looks at the subject from the manufacturer's viewpoint as well as his own, and implies that in long-time operations the construction industry, including the ultimate equipment user, suffers from this unsound business practice.

Allowing for differences in manufacturers' psychology and selling philosophy, "we as distributors have learned that these concepts can be divided fairly accurately into two classes.

"The first class, which includes, in my judgment, a great majority of the manufacturers, are those who consider the distributor as a necessary factor in the economical marketing of construction equipment. They know that it is conducive to their interest to keep the distributor on the right side of the profit and loss column in the sales of their equipment, and whenever a deal is in such a condition as to show a loss, do not hesitate to advise rejection. While they, properly, exact of the distributor financial stability, expert salesmanship and skilled service, they do not advise him to make any allowance for a trade-in other than, in his opinion, will yield a reasonable profit on the sale of trade-ins. I doubt whether any sound business has ever been lost by this concept of the manufacturer-distributor relationship.

"The other minority class of manufacturers may be designated the pressure group. Volume sales are required. Profitable trade-ins for the distributor are secondary. Sooner or later the distributor representing this type of manufacturer finds himself loaded down with a costly used equipment inventory in which most of his comparatively small capital is invested. Such a distributor loses independence and invites failure.

*From a paper by W. G. Morgan, Past President, Associated Equipment Distributors, first published in A.E.D. BULLETIN, July, 1939, and reprinted, with editorial comment, in CONSTRUCTION EQUIPMENT NEWS (A.E.D.) for September, 1953.*

**Eaton Personnel Changes.** Howard J. McGinn, President of Eaton Manufacturing Co., Cleveland, O., has announced the election of two new officers: F. H. Mott of Detroit who becomes administrative vice president in charge of all Eaton plant operations in Michigan, and R. E. Fisher who becomes vice president in charge of sales for the corporation. R. H. Dinsley, formerly vice president-manufacturing, becomes administrative vice president in charge of all Eaton plants in Ohio, Kenosha, Wisconsin, and London, Ont.

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### New publications

FILLING AND SEALING JOINTS AND CRACKS OF CONCRETE PAVEMENTS. Bulletin 78, Highway Research Board. 38 pages with diagrams. Technical summary presented at the Board's 32nd annual meeting January, 1953.

FLEXIBLE PAVEMENT DESIGN. Bulletin 80, Highway Research Board. Design methods in use by various state highway departments for determining thickness of flexible pavements, comprising report of committee on flexible pavement design.

TRAVEL TO COMMERCIAL CENTERS. Bulletin 79, Highway Research Board. Includes discussion of traffic in Washington metropolitan area by Gordon B. Sharpe, and factors in planning regional shopping centers by Kenneth C. Welsh presented at the Board's 32nd annual meeting January, 1953.

HIGHWAY RESEARCH ORGANIZATIONS. Special Report 15, Highway Research Board. Description of existing organization patterns and activities. By M. Earl Campbell.

Foregoing bulletins available by addressing the Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C.

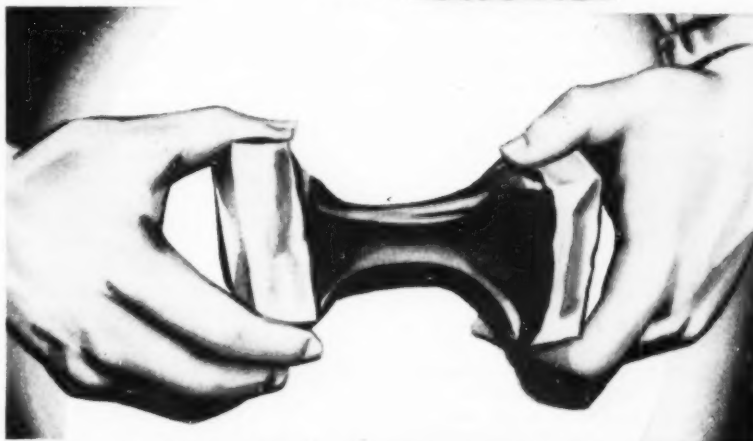
THE THEORY AND PRACTICE OF REINFORCED CONCRETE. (3rd edition) By Clarence W. Dunham, associate professor of civil engineering, Yale University. Price \$7.00. McGraw-Hill Book Company, 330 West 42nd St., New York 36, New York.

PROCEEDINGS, 5TH CALIFORNIA STREETS AND HIGHWAY CONFERENCE; University of California, Berkeley, February 4-6, 1953. 116 pages. Price \$2.00. Contains complete text of numerous papers presented on planning and administration, construction and maintenance, traffic, education and research, and urban transportation.

PARKING AS A FACTOR IN BUSINESS—PARK FREE, RELATIONSHIP BETWEEN DOWNTOWN AUTOMOBILE-PARKING CONDITIONS AND RETAIL-BUSINESS DECENTRALIZATION; by William J. Watkins, Bureau of Business Research, University of Michigan. For copy address The Highway Research Board, 2101 Constitution Avenue, Washington, D. C.

PARKING AS A FACTOR IN BUSINESS—PART 4, CENTRAL CITY PROPERTY VALUES IN SAN FRANCISCO AND OAKLAND. By Paul F. Wendt, Bureau of Business and Economic Research, University of California. Published by the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

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## Senseless and Confusing

# Variations in Our State Road Specifications

*Wide variation still exists in state highway specification wording on such basic items as proposal guaranty, promptness of awarding, completion time, liquidated damages, extra work, methods and equipment requirements, pay item measurement, etc., etc. The intra-state contractor is the most confused, but it's the public who pays for poor specifications, notes this review.*

**By W. C. Peterson**

Chief, Construction Branch, U. S. Bureau of  
Public Roads, Washington, D. C.

A PERSON making a comparative study of the standard specifications of the various State highway departments might be led to speculate on the desirability of adopting the preface idea so dear to the hearts of the authors of "whodunit" mystery stories: "Any resemblance to other specifications, active or dead, is purely coincidental." That statement is greatly exaggerated, of course, but it does serve to emphasize the fact that there are many significant variations among the several specifications.

Some of the variations are necessary and desirable since each State must tailor its specifications to fit local conditions and to use local material to the best advantage. There is no quarrel to be had with these variations. In fact, if criticism is to be offered it is that there are not enough such differences; that the States have not been diligent enough in their efforts to provide for the fullest and most economical use of local materials.

### Based on Opinion

On the other hand, many of the variations represent only differences of opinion. At best these variations in specifications present only a source of minor irritation to the contractors; at worst they result in higher costs with no improvement in the quality of the work. It is this latter class of specification differences that I wish to bring to your attention in this brief discussion.

Twenty, 15, or even 10 years ago these differences were not so significant. A contractor, ordinarily, confined his operations to a single State or, at most, to two or three neighbor-

ing States. He could by long usage become intimately versed in all the vagaries of these particular specifications and could develop his organization accordingly. Today the picture is different. Highway contractors no longer are bound by state lines. For example, particularly where large projects are concerned, we may quite often find contractors from California bidding in New York State, contractors from Minnesota in Texas, and so forth. The record shows that some of the large contracting firms work in as many as 8 or 10 states in the course of a year's time. Such contractors must study and become familiar with many specifications and in preparing their bids must consider several different factors depending upon the State in which they are bidding.

### General Provisions Differ

Many of the areas of significant difference are in the general provisions of the specifications and in the bidding procedure.

Consider the matter of proposal guaranties required of the bidder as an earnest that he will accept the contract if it is tendered. The requirement for proposal guaranty ranges from a flat \$1,000 cash deposit to a bond in the amount of 150 per cent of the bid total. (This 150 per cent bond serves also as a performance bond and the proposal is actually the contract, requiring only the signature of the state to make it binding.) Twenty-seven of the states establish the amount of the proposal guaranty in the individual call for bids, 11 require 5 per cent of the bid amount, 5 require 10 per cent, the others are scattered among varying requirements. Some of the states will accept bid bonds; others require cash deposits, either in actual currency, certi-

fied checks, or other negotiable paper. Some states immediately return the guaranties to all except the low bidder. Many, however, retain the guaranties of the three low bidders until the contract has been awarded.

The time reserved for the award of contract varies greatly, too. Three states must award within 10 days, 17 within 30 days, 4 within 60 days, 2 establish no time limit, and the others are scattered among intermediate time limits. Similarly, the time allowed the contractor to execute the contract ranges from 6 to 30 days, with 31 States requiring the return of the executed contract within 10 days.

### The Confused Contractor

Let us build a synthetic case to demonstrate what might happen. Suppose a contractor bids on a \$2 million job, posting a 10 per cent cash guaranty in the amount of \$200,000. He is third low and his guaranty is retained while the award is being considered. Since he is third low he is reasonably sure he won't get the job so he looked around for other work. The next week he bids on a similar job, again posting a \$200,000 guaranty and this time he again is third low in the bidding. Again his guaranty is held up. At best he now finds himself with some \$400,000 invested for as much as two months with no productive return—a very real and appreciable economic loss to him. Worse still, he may find that so much of his liquid assets have been encumbered that he cannot bid again until the guaranties have been returned. Or his working capital may have been depleted to the extent that he can no longer carry on his current work efficiently.

I doubt that such an exaggerated case ever happens. For projects of this size the guaranty requirements probably would be rationalized by special provision if the standard specifications were unrealistic, and ordinarily the contract award is made promptly. The illustration, however, does point out what might happen and highlights what does actually happen, in some measure, time and again.

### Completion Date Formulas

There are three methods used in the establishment of the time allowed for the completion of the contract. In some states a definite completion

Presented at the Construction Committee Meeting, Annual meeting of American Association of State Highway Officials, Pittsburgh, Pa., November 11, 1953.

date is stipulated in the proposal; some specifications base the count of time upon calendar days; other specify working days. The weakness of the specified date of completion method is that the date is fixed prior to the call for bids and does not consider possible delays in the award and execution of the contract. As an illustration, not too long ago I saw a contract which showed the date of completion as the day following the date on which the contract was executed—a patent absurdity. The calendar day count of time is the most simple, but its weakness is that it does not allow for consideration of extraordinary weather conditions. The working day basis for the count of contract time is probably the fairest. It is, also, the hardest to apply fairly and without controversy. Some specifications define a working day one way, others differ, and some present no definition at all.

The amount of liquidated damages to be assessed when the contract time overruns varies, too. Eighteen states provide tables in their standard specifications stipulating the amount of liquidated damages based upon ranges in size of the contract. Five states designate a fixed sum to be paid for each day overrun regardless of the size of the contract. Eighteen states require that the contractor pay the expense of engineering incurred by the state after the contract time has expired. This latter course is probably the fairest but it does require considerable effort to establish and verify the appropriate charges.

#### **Quantity Changes**

There are 19 different variations in specifications governing extra work and increased or decreased quantities. Actually the differences are relatively minor and in the main the variations are in the determination of the increase or decrease which will require a supplemental agreement. Nineteen states base their requirement upon changes in the total length of project or amount of contract. Twenty-eight states provide for supplemental agreements if the quantities of any major item change by a designated percentage, and there are six separate methods specified to designate these major items.

Other general provisions wherein there are significant variations include: Maintenance of Detours; Signs and Barricades; Responsibility to the Traveling Public; etc. The contractor bidding under unfamiliar specifications may find that he has overlooked an item of significant expense among these stipulations.

#### **Specifying Methods**

As I mentioned in the beginning, many of the variations in the detailed specifications for contract items are necessary and desirable in order

to permit the full use of local materials. There are, however, other variations which cannot be so easily explained or justified. These are found most often in the detailing of required construction methods and result from the prevalent practice of spelling-out construction operations in detail rather than designating the results to be obtained.

These differences are most apparent in the several requirements regarding equipment. For example, many states give the contractor the option between the use of continuous and batch mixers in asphaltic concrete construction. In other states only batch-type mixers are acceptable and a contractor may find that he cannot cross a state line to bid on work of this type because his equipment is unacceptable.

The classic example of confusion in the specifying of required equipment is found in the specifications for earthwork compaction. Some states require flat-wheel rollers, some pneumatic, others sheepsfoot, and still others combinations of various sorts. Certain specifications demand that a stated number of rolling units be furnished even though the contractor's method of operation may be such that adequate compaction could easily be obtained with a lesser number.

#### **Sheepsfoot Roller Details**

Even if we confine our consideration to sheepsfoot rollers we still find plenty of confusion. There are 4 identifiable, distinct and different requirements regarding minimum projection of the feet; 12 variations in specification regarding permissible end area; and 15 separate weight requirements expressed as pounds per inch on the tamping feet. When we consider the various combinations that can be made of these three separate requirements we arrive at a number which is quite staggering and which might well convince any equipment manu-

facturer that he should convert to baby buggies.

#### **Lawyer Needed**

Another place where we find pronounced differences is in the method of measurement and basis of payment of many of the construction items. For instance, the item of clearing and grubbing would seem to embrace a relatively simple operation and could be simply specified. This has been done in some of the specifications which are so clear and concise that they can be understood at the first reading. Other specifications, among which I must list those of my own organization, are so involved and complicated that long and careful study, and even advice of counsel, is required to determine just when and in what measure payment for the item will be allowed.

Overhaul, Embankment Construction, Watering, Rolling, Excavation for Structures, and Piling, to mention just a few, are items showing significant variations in the specifications. I think, however, that I have presented enough detailed discussion to make my point.

While I have pointed out some instances where specification differences work some injustice to, and impose additional cost upon the contractor, I would not have you think that I come here to plead his cause. Certainly, his side of the story should receive sympathetic consideration. The contractor, however, is first and foremost a hardheaded businessman, operating in a highly competitive field, and he is amply able to take care of himself. You may be assured that any additional cost will not lodge in the contractor's billfold but will be passed on to the highway purse in the form of higher prices bid.

It is my belief that our highway specifications, as now written, do result in higher prices than would be necessary if there were more uniform-

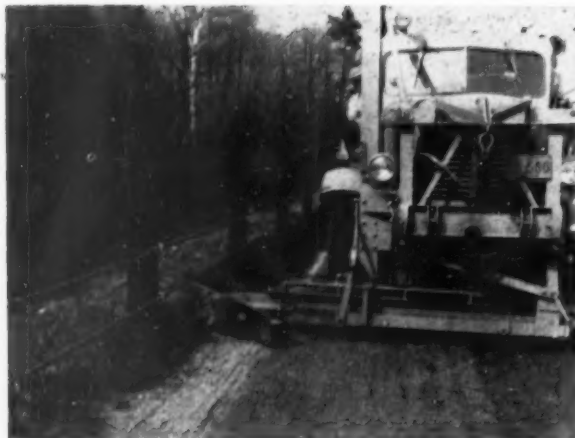
*(Continued on page 86)*

### **What Is Your Sheepsfoot Specification?**

I defy anyone to prove that a roller having feet projecting 6 in., with an end area of 8 sq. in., will not work equally as well as one with 7-in. feet of 9 sq. in. end area. It seems absurd, then, to require that a contractor buy or rent other rolling equipment if he wants to work in a different state. We all know, of course, that these fine distinctions are more honored in the breach than in the observance.

It is common practice to ignore or waive these inconsequential restrictions. It does seem, though, that it would be better business to rationalize our specifications to the point where they can be properly enforced rather than to continue to ignore even inconsequential requirements.

The science of soil engineering has now been developed to a point where a specification based on results could be written which would be as easily enforced with equal or better results as one stipulating fixed methods and requiring designated equipment.



★ The first operation clears the windrow of sand and dirt on the travel-way side of the guide rail



★ The second operation pushes the windrow from beneath the guide rail to the outer slope

## Device Removes Excess Dirt from Berm

A METHOD of removal of the earth berm, created by accumulations of winter sand and dirt, has been developed by District One Forces in the Connecticut state highway department. As shown by the accompanying photographs, the mechanical removal of the berm is fast and positive. It is also said to be economical.

The mechanization was developed to cope with a growing problem of removing the berm or ridge of sand and dirt beneath roadside fences. In many instances the accumulation had been stabilized in place by growth of vegetation and was sufficiently high to block the free flow of surface water to the slope of fill sections as originally designed. Water tended to concentrate and flow along this unintended berm until some spot ap-

peared adequate to permit a leak off.

In addition to these difficulties the weed growth which took root was not only unsightly in summer but required continual hand cutting, a time consuming and expensive operation.

The unit consists of a double acting hydraulic cylinder, mounted on slides attached to a 7-ft. long H-beam. The H-beam slides back and forth on a stationary I-beam attached to the front end of a four wheel drive truck. The horizontal throw or movement of the I-beam is 5 ft. Pressure to activate the cylinder is obtained from one of the hydraulic cylinders at the rear of the truck cab, normally used for raising and lowering the wing plow attachments.

Two mold board scraper attachments are used to remove the bars.

A 4-ft. long mold board with scraper edge is attached to and mounted at an angle with the H-beam and is used for blading winter sand and dirt accumulation on the shoulder. This operation deposits the material in a windrow under the guide rail cable. The next operation brings into play a 5-ft. mold board with scraper edge which is mounted at right angles to the H-beam. This is used to cut the berm and cast it down the embankment. The area thus cleared is then leveled off by hand.

It is found that it takes about two minutes to remove one blade and attach the other. Comparative production studies covering hand methods and the newly devised mechanical method indicate that the machine will remove approximately eight times as



much material for a particular cost compared with conventional methods. Based on these studies it has been estimated that about 3,500 lin. ft. of berm can be removed by the mechanical method in an 8-hour working day.

The area disturbed by the removal of the berm is oiled as a final stabilizing operation and also to prevent future vegetative growth directly beneath the guide rail.

The idea of using a four wheel drive truck for the power was conceived by J. J. Blaney, Equipment Inspector and Steve Choma, Garage Foreman.

### Prestressed concrete slabs as centerline markers

A broken centerline, designed to be highly visible, was built into an intersection pavement in Milwaukee recently. As shown in the accompanying picture the line was constructed by the building of concrete slabs into the concrete base prior to applying the bituminous surface.

The "news" of this work lies in the use of prestressed, precast concrete units. The slabs were 5 in. wide and 3½ in. thick. Two 3/16-in. wires of high tensile strength steel were used for the prestressing and reinforcement.

West Allis Concrete Products Company supplied the slabs for this project which was undertaken on an experimental basis by the city of Milwaukee. It is believed that this is the first use of prestressed, precast concrete units for pavement markers.

### Is this the Nation's highest bridge?

A newspaper report recently credited World Almanac editors as saying



★ Clean shoulder and slope prior to oiling beneath guide rail

that the Bluestone River bridge on the West Virginia Turnpike, now under construction, is the highest in the United States. Its deck will be 255 ft. above the water.

This report says that the previous highest bridge is New York City's George Washington bridge 252 ft. above the Hudson at low water level. Other high bridges are Golden Gate, San Francisco, 238 ft.; St. Johns, Portland, Ore., 205; Rainbow, Niagara Falls 189; Chesapeake Bay, Kent Island, Md., 188; The Narrows, Tacoma, Wash., 185; Longview, Columbia river, Washington, 185; Delaware Memorial, Wilmington, Del., 180; Port

Arthur-Orange, Neches river, 176; San Francisco-Oakland, 173; Bear Mountain, Hudson river, 158; and the Ambassador at Detroit, 155.

### 12-year Maryland program starts "rolling"

The State Roads Commission has set up a road construction program totalling \$77,065,000 for 1954 which is to include 42 primary and 72 secondary road projects. Russell H. McCain, Chairman of the Commission, said that the program already has a \$12,000,000 head start through the advertisement of contracts for 63 road projects. It is hoped that \$30,000,000 worth of work on the State's primary highway system will have been advertised or contracted for by mid-July as well as \$12,000,000 worth of secondary road projects.

Among the major projects are extensions to the Eastern Shore Expressway, the Baltimore-Harrisburg Expressway, and the Washington-Annapolis Expressway. \$14,000,000 for surveying, planning and buying rights-of-way for future road building under the \$568,000,000 12-year roads program is contemplated in addition to the \$77,065,000 construction fund. Distributors See "10 Year Backlog"



★ Prestressed concrete centerline markers being built into an intersection pavement in Milwaukee. (Milwaukee Journal photo)

• One vehicle in every 4,000 using the Pennsylvania Turnpike in the past eleven years has been involved in a major or minor accident, according to a summary published by "Automobile Facts." Driver errors accounted for 85% of the accidents.



● Tower shown fully erected, and also partly erected.

## Army develops lightweight triangulation tower

A lightweight, air-transportable triangulation tower which can be erected at heights varying from 37 to 103 ft. in less than one working day by an experienced five-man crew has been developed by the Army's Engineer Research and Development Laboratories, Fort Belvoir, Virginia.

Made of aluminum, its structural members weigh only 3,617 lb., or 3,020 lb. less than the standard World War II steel tower of the same height. Complete with two sets of anchors, platforms, extra bolts and a chest for small parts, the entire ensemble weighs 4,152 lb. Dismantled, the tower is carried easily in a standard Army 2½-ton truck and can be dropped from a helicopter to troops in inaccessible areas without extensive damage.

The new structure, whose longest member is 14 ft. and heaviest member but 60 lb., is actually two mutually independent towers in one. The inner tripod is fitted with an instrument table while the outer one (113 ft. high) serves as a working platform for the observer and his recorder, and as a support for signal lamps used as targets. The tripods are completely separated to prevent the surveyor's movements from disturbing the delicate adjustment of the instruments.

## St. Louis makes progress on traffic problem

St. Louis made strides in 1953 toward solving its traffic snarls, according to a news item quoting traffic commissioner Charles G. Gonter.

The chief means were the adoption of a master traffic plan, including one-way major streets downtown; re-routing of street car and bus routes; coordination of traffic flow by synchronized signals; and the barring of parking during rush hours on certain streets.

A jay walking ordinance was also enacted, and trouble spots in traffic were eased by dispersion and elimination of numerous left-turn locations.

A master traffic plan, sponsored by the Chamber of Commerce of metropolitan St. Louis, has been put in operation gradually throughout the past year. The result is a reduction in travel time to and from downtown, and a reduction in traffic facilities for the year from 119 in 1952 to 106 in 1953.

The first modern expressway in St. Louis will be completed in 1954—a two-mile inter-regional link that will circle the downtown area on the river front and later be tied in with state and county expressways.

**S. K. Wellman Appointment.** Robert C. Brigleb has been appointed assistant sales manager, Jobber replacement sales by The S. K. Wellman Co., Bedford, O.

## "Weather Sensing" sign for turnpike patrons

The Pennsylvania Turnpike Commission has installed a new, experimental electronic device designed to further promote safety.

Known as a "weather sensing" sign, this pioneering device, 7½ by 11 ft. in size, and mounted on steel channel uprights just beyond the shoulder, tells drivers what driving conditions to expect ahead of them, so that they may limit their speed to existing conditions. Automatically operated, the sign instantly translates unknown advance driving conditions into adequate, illuminated warning displays.

Three warning lines are provided, each individual line furthermore allowing any of three different wordings—providing in all the following five different word combinations in letters one-foot high and readable for 200 yards:

Danger	Fog
Slow	Roadway Wet
Danger	Snow
Clear Roadway	
Danger	Roadway Freezing

Automatic operation is attained by a master sensing device which controls the word formation appearing on the display sign by means of three sensing elements:

(1) A highly developed electric eye, a photo cell with the sensitivity of its threshold circuit so adjusted as to give the motorist a display sign warning of a fog condition ahead at the first sign of obscuring fog or smoke;

(2) A precipitation pickup detecting rain adjusted to make the sign read, "Slow, Roadway Wet";

(3) A sensing element translating the temperature into the proper impulse in conjunction with the other two elements to indicate on the sign that the roadway condition ahead is freezing or that there is snow on the roadway.

When conditions of the roadway in the vicinity of the sensing device are normal the sign displays the message reading, "Clear Roadway."

In nearly 20 per cent of the fatal accidents reported in a recent national survey, road conditions were reported as wet, icy, foggy or snowy.

## Specifications

(Continued from page 83)

ity among the several specifications and more simplicity in all of them. It is my belief that you, acting individually as members of your several highway departments and collectively as a committee can render a significant service to our profession by work which will rationalize, simplify, and make more uniform the specifications of the various State highway departments. I commend this activity to your attention.

# **THE NEW CATERPILLAR D8 TRACTOR**

The new Caterpillar D8 Tractor...designed and built by Caterpillar, sold and serviced by the world-wide Caterpillar Dealer organization.

With 150 HP available at the drawbar, the new D8 offers new standards of track-type tractor power, production and value.

Meet the new boss of the crawlers!  
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

**More Power...  
More Profit...  
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**THE NEW D8  
Boss of the Crawlers**

- The new D8 has more drawbar horsepower...horsepower that works for you.
- The new D8 is compact...it retains the maneuverability needed in tractor applications.
- The new D8 is versatile...matched to Caterpillar-designed Bulldozers, Scrapers, Rippers and Pipe Layers.
- The new D8 is also a pusher...available attachments make this machine a powerful push tractor.

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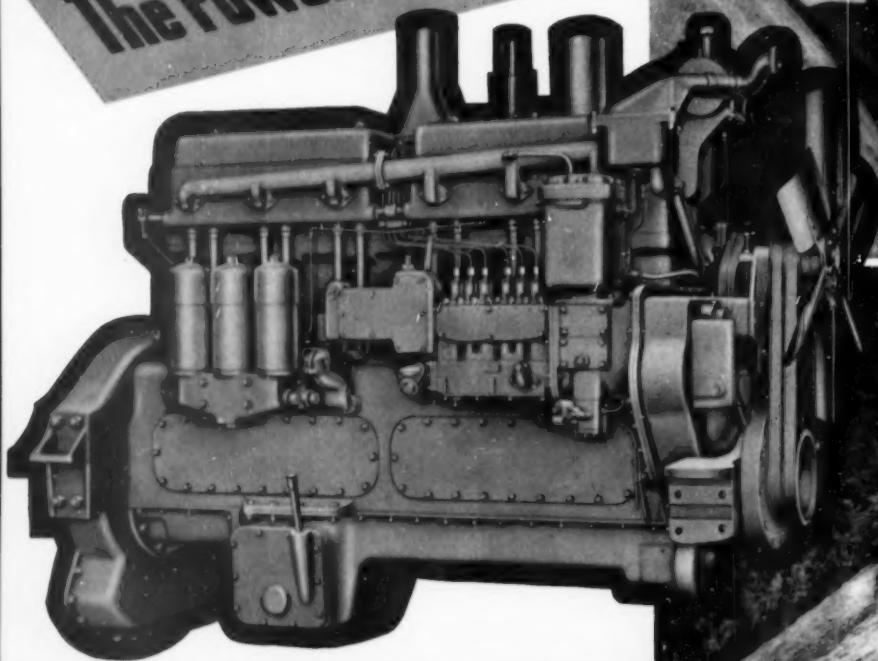
## **150 Drawbar Horsepower Provided by Caterpillar D8 Engine**

The new high performance of the Caterpillar D8 Tractor stems from the 185 HP, 1200 RPM diesel engine.

Important new features, built into the time-tested and job-proved Caterpillar design, contribute to longer engine life and decreased operating costs as well as higher power. Some of these features are: new cylinder head incorporating valve rotators and hardened valve seat inserts, new camshaft, aluminum alloy pistons with stainless steel heat plug in the high temperature zone and a cast-in iron band for the top piston ring groove. A larger oil pump driven from the front of the crankshaft has an exclusive throttling valve pressure control which assures correct lubrication for all moving parts from the first turn of the crankshaft.

This powerful engine, with these and many other advanced features, is one of the big reasons why the D8 gives you more value than ever before.

**The Powerful D8 Engine**





## The Oil Clutch

### Exclusive with Caterpillar Profitable to You...

Only Caterpillar offers you the long life and low maintenance cost of the oil clutch. The outstanding feature of this advanced clutch is that oil films absorb the friction and heat. The metallic friction surfaces do not come into contact until the last revolution or two before engagement. The clutch has its own lubrication system with gear-type pump and suction screen. The pump supplies oil under pressure to the hydraulic booster, which makes the clutch exceptionally easy to operate. Oil is also delivered to the inner diameter of the three clutch plates. This continual lubrication and cooling is the principal reason for much longer periods between adjustment and replacement than is possible with the conventional dry clutch. The oil clutch is another big reason why the D8 is a better buy.

### THE NEW D8 GIVES YOU...

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- New Long Life Engine Features
- Exclusive Oil Clutch
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- New High-Strength Frame
- "Hi-Electro" hardened track grouser tips
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- New, Large Air Cleaner
- Weight 38,155 lbs. (shipping weight)
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- Double Universal Joint to Protect Clutch and Transmission Bearings

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## THE NEW D8 Boss of the Crawlers

Your Caterpillar Dealer, with genuine Caterpillar parts, factory-trained service personnel and competent application counsel, is ready to show you the advantages of the new D8 Tractor. He can...and will...prove its power and production capabilities. Call on him for complete details. For power, production and profit, make your next tractor a new D8...boss of the crawlers.



**Caterpillar Tractor Co., Peoria, Illinois, U.S.A.**

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Boss of the Crawlers**

The new Caterpillar D8 Tractor offers new highs in earthmoving production in push-tractor operations. The D8, equipped with No. 8S Bulldozer, heavy duty track roller guards, crankcase guard and tandem pusher frame, will cut your work cycles to a minimum.

Fast and maneuverable, the D8 applies a full 150 HP to the job of loading your hauling units in new record times. Push-loading, singly or in tandem, is provided to meet the conditions of your job.



# *Bituminous* **ROADS AND STREETS**



#### Cover Story

• Asphalt penetration testing  
strip being placed on arterial  
road in western New York state,  
preparatory to resurfacing.

**Improving U.S. 20 New York  
With Jaxon Paving Co. on Florida Airfield  
Graphical Method for Combining Aggregate  
Stripping Evaluation by H. G. Nevitt**

*Published by Asphalt Publishing Company  
25 West Maple Street, Chicago 10, Illinois*

**MARCH, 1934**



## This Etnyre is 25 years young!

A profit-maker for 25 years, this Etnyre "Black-Topper" is still going strong, according to Plant Superintendent Luecking of Rock Hill Asphalt & Construction Co., Clayton, Mo.

Basically the same rig that was built by Etnyre in the 1920s, Rock Hill has added a new full circulating spray bar and replaced the engine. Also, over the quarter-century of service, new trucks have been required. But the tank, the heating system, the compact distributing system, and other quality Etnyre features have lived through hard usage for going on three decades.

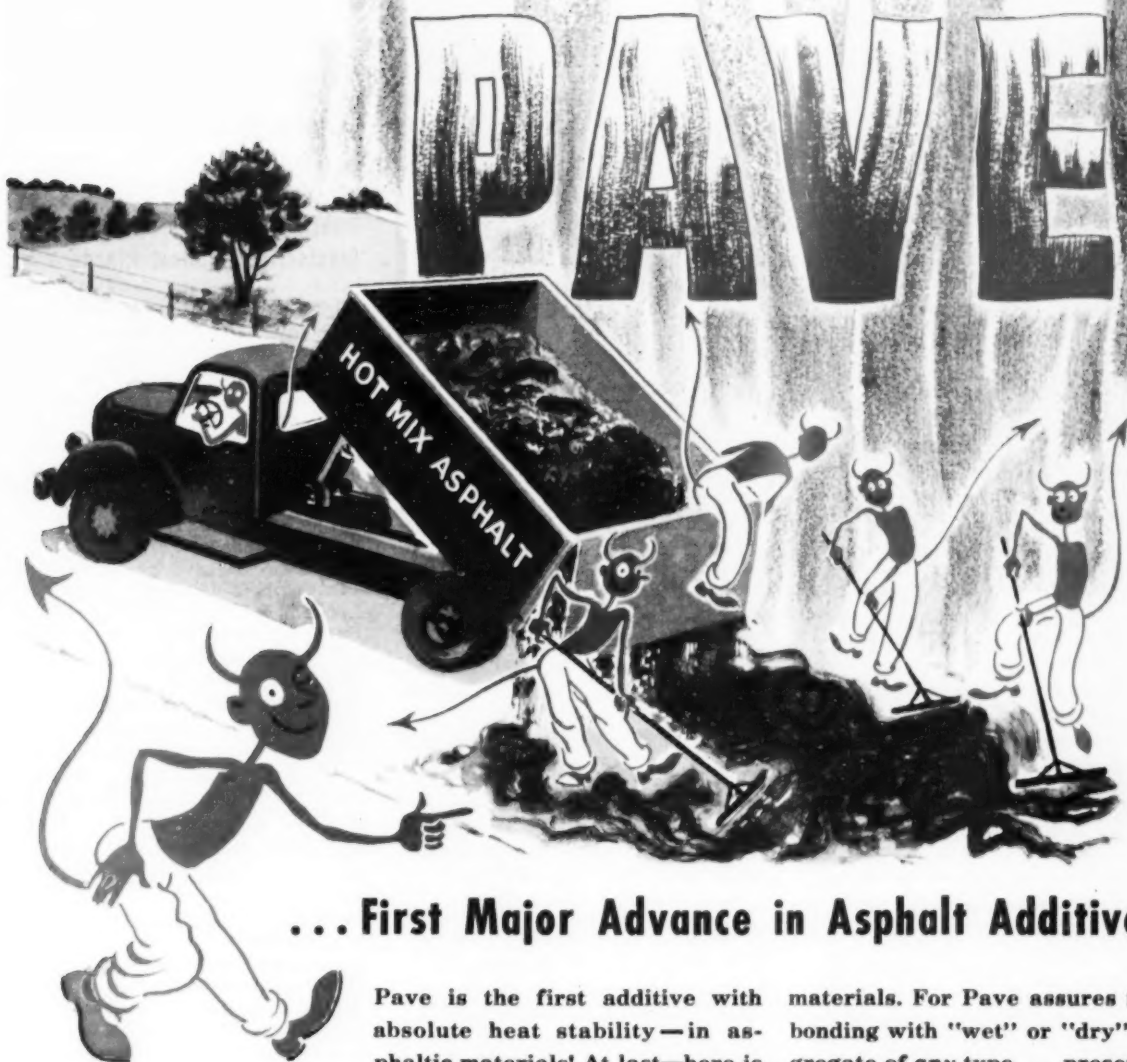
Even today, Mr. Luecking reports, the aged "Black-Topper" requires only minimum normal maintenance. It starts fast, heats quickly, fills easily, is simple to handle, and flexible in operation. The relatively new full circulating spray bar distributes material evenly as it handles all types of liquid asphalt (including emulsions).

You can have this same rugged, long-life construction plus dozens of new, improved design features on your new "Black-Topper." For latest data and prices, see your Etnyre Dealer, or write E. D. Etnyre & Co., Oregon, Illinois, U. S. A.

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**"Black-Topper"**  
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Pave is the first additive with absolute heat stability—in asphaltic materials! At last—here is an additive for hot mixes. And, Pave insures you of 100% additive benefit in cut-backs and emulsions.

A new high in bonding strength is obtained with Pave-treated road

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Besides producing asphalt emulsions which meet all specifications of A.S.T.M., A.A.S.H.O., Asphalt Institute, and the various state, county, and city public works departments . . . McConnaughay Licensees manufacture and recommend Weather-Proof Emulsions with these special qualities:

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2. *Resistance to heat.* Emulsions do not bleed or soften during hot weather. Mixtures of emulsion and aggregate show great strength at 140°F.
3. *Resistance to cold.* Emulsions are tough and resilient instead of brittle at temperatures below freezing.

And here are some of the tests made to assure these all-weather qualities: *Stone-coating*—after a five-minute mix of aggregate with 7% emulsion, the mix must stand immediate washing without loss of asphalt film. *Float* test on emulsion residue at 140°F. must be higher than 800 seconds (pure asphalt of 85-100 penetration tests at about 275 seconds). *Penetration* test on emulsion residue at 140°F. requires a reading of 15 to 50 with a 1" diameter needle (pure asphalt of 85-100 penetration tests from about 200 to 300). Low temperature penetration tests are also run at 32°F.

Complete test procedures and specifications for McConnaughay Weather-Proof Emulsions will be mailed upon request.

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**EMULSIFIED ASPHALT**  
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Providence 7, Rhode Island

Seaco, Incorporated  
Columbia, South Carolina

C. C. Plumb  
Hartford, Connecticut

Asphalt Products Co., Inc.  
Nashville, Tennessee

E. A. Mariani—Emulsified Asphalt  
Tampa, Florida

Emulsions, Inc.  
Lawrenceville, Illinois

Walsh & Ikeler  
Gary, Indiana

Ready-Mix Asphalt, Inc.  
Fort Wayne, Indiana

Fauber Construction Co.  
Lafayette, Indiana

Brookman Construction Co.  
Muncie, Indiana

Bituminous Materials Co.  
Terre Haute, Indiana

Wabash Valley Asphalt Co.  
Terre Haute, Indiana

Asphalt Materials and Construction, Inc.  
Indianapolis, Indiana

Pan-Am Southern Corporation  
New Orleans, Louisiana  
(Also serving Alabama and Mississippi)

Doherty and Swearingen Co.  
Yarmouth, Maine

Berkshire Asphalt Co., Inc.  
Springfield, Massachusetts

James Huggins & Sons, Inc.  
Malden, Massachusetts

Bituminous Materials Co.  
Jackson, Michigan

*Eastern Representative:*

John A. Dow  
157 Church St.  
New Haven 10, Connecticut

### SPECIFICATIONS OF THESE COLD-MIX PROCESSES AVAILABLE ON REQUEST

1—Penetration Macadam, 2—Open-Graded Plant Mix, 3—Open-Graded Road Mix, 4—Dense-Graded Plant Mix, 5—Dense-Graded Road Mix, 6—Mat Coat, 7—Seal Coat, 8—Sand Mix, 9—Sand Honing, 10—Patching.

## VIEWS AND COMMENTS

By H. G. Nevitt

# Stripping Evaluation

Since our remarks on this page in April 1953 concerning stripping, including evaluation of the effects, we have been asked for our suggestions on the proper test technique to measure the stripping tendencies of an aggregate. We question if the full information on which to base a completely satisfactory test is at hand. However, its basic requirements can be stated; and with a little work by the parties interested a suitable evaluation procedure should be obtainable. Since they involve the fundamental mechanism of stripping, a discussion of these considerations might be of interest. They are primarily three in number.

The first concerns the type of test. Stripping causes trouble by impairing the binding action, hence the structural quality of the surface. Other effects are secondary and therefore of only indirect concern. Where the asphalt film is more or less completely removed the proportion of aggregate area stripped—determined visually or otherwise—is a satisfactory criterion of the danger. For partial stripping this is no necessary relationship between the damage and the area stripped; furthermore there is often no perceptible film removal. Obviously the only really satisfactory test is one which measures the structural impairment, presumably directly.

### Structural Impairment

This requirement becomes even more important in evaluating the ability of additives to control stripping. Structural impairment results from diminution of the cohesion factor in the aggregate-asphalt mixture, due to loss of adhesion between the asphalt film and the aggregate surface. The effectiveness of an additive is proportional to its ability to prevent this adhesion loss. It is perfectly possible for an additive to provide sufficient adhesion to maintain contact between the film and the aggregate, hence show no stripping tendency by any visual or area removal test, but still not enough to give the full adhesion of the asphalt film before contact with water. A structural

measurement will determine exactly how effectively this adhesion is maintained, and quantitatively rate additives which may show equally well on an area stripping basis. Superficial film retention is not enough.

The second requirement is that the mix quality be measured by its structural value after the indicated immersion rather than through some ratio of final to initial strength. A mix of high stability might not fail despite a 75% loss of strength. One with a low dry value might fail if it depreciated only 25% after soaking. Perhaps it will be found desirable to set some maximum allowable percentage loss in stability to assure no undesirable secondary effects, but a minimum safe value can not be established. The surface must not fail in its weakest possible condition; and the structural values which must be set to prevent this represent the greatest allowable depreciation for that job.

### Right Soaking Conditions

The third requirement is that the soaking conditions for the test must likewise suit the specific project. The stripping tendency, if present to any appreciable degree, tends to be a continuing phenomenon, with the rate of impairment likely to be quite variable and without relation to the degree which may be reached. Stripping on the highway may therefore be determined not merely by the mix tendency but the severity and length of exposure. Short exposure in a hot climate or lengthy moisture contact at low temperatures may not cause trouble with a surface that would show distress under prolonged exposure in hot weather. Mats adjacent to irrigated land in hot arid climates, particularly where the moisture plane is not properly intercepted by a sufficiently deep and wide ditch, may show severe stripping despite good results from the same aggregate elsewhere or its satisfactory showing on present day stripping tests.

An arbitrarily chosen soaking period does not therefore seem warranted. Furthermore, where the temperature is increased to speed up the

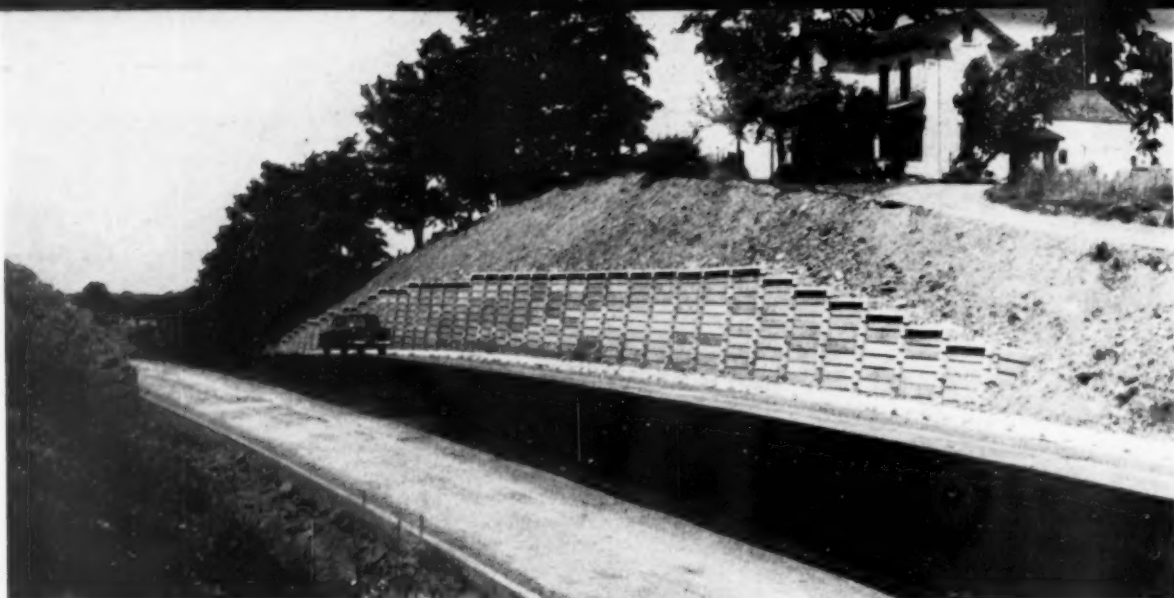
deterioration, the correlation between the exposure and test temperatures must be established to a reasonable extent. Probably these difficulties can be met by classifying exposure conditions in some fashion—such as mild, medium, and severe—and establishing corresponding soaking conditions for the test specimens in the structural test used.

Stripping characteristics are specific—that is, determined by the particular aggregate and asphalt combination. The remedial effects of additives are also specific. From the preceding discussion it can be seen that the test procedure and the permissible values of structural strength after water exposure are equally so.

This may not suit those who desire to establish an aggregate stripping rating independent of particular use conditions, but it does not seem basically objectionable. It merely means that the structural quality of the intended or design mix must be determined after exposure under conditions duplicating the results of those to be met in service, and the design then checked to be sure that it is still satisfactory under such conditions. Neither the ideas nor the practical program involved offer any real difficulty. The need is simply to face the situation, determine the controlling facts, and act accordingly. The saving in maintenance that will result will outweigh many times the trouble and cost of doing the designing and testing properly.

### Time-Loss Index

The above process may prove even simpler if an important scientific principle is verified by further work. The first studies measuring directly the structural impairment resulting from stripping—at least in this country—were reported in the A.A.P.T. paper by Loomis and Krchma a number of years ago. This work indicated that a constant time-loss of strength rate existed for any mix under set test conditions. If this is found to universally hold, even to only an approximate degree, the strength for  
(Continued on page 100)



• This hill-top, the scene of several bad collisions, has been cut down approximately 20 ft., roadway widened to 48 ft. (two truck lanes added), and concrete cribbing placed to minimize encroachment on farmhouse lawns on either side.

## Program to Improve U.S. 20 New York

**Hilltops cut down, truck lanes added, ditch lines moved, pavement widened and resurfaced—this is the formula by which New York state engineers are fixing up this important route for greater safety and traffic capacity.**

**By WILLIAM ROBINSON**

District Engineer, New York State  
Department of Public Works, Syracuse, New York

**I**N nearly every state the highway department is faced with the problem of modernizing many miles of old roads without the expense of complete reconstruction. In New York we have our share of highways

which are deficient in one or more of the modern design essentials. The problem has been accentuated by the rapid postwar rise in traffic volumes. And in the case of our principal east-west route through the central New

York region, there is the special problem of exceptionally long grades and "hill and dale" profiles.

Route U.S. 20 has been the subject of a concentrated program in our highway district. What we have tried to do to improve this road may seem like a series of common-place betterments, hardly worth mentioning. But the effort, we believe, is of wide significance for several reasons. One reason is the nation-wide prevalence of the general problem of adapting inadequate roads to present-day traffic requirements. The U.S. 20 modernization program, for another, is an example of the flexibility of thinking required of our designers, to study each mile and make such changes as can be afforded within budgetary limitations to eliminate hazards and increase the capacity.

And this work is significant in that it reflects a policy of the New York state department of public works, which is to use a part of each year's funds to preserve and adapt old roads, while also giving the public each year some entirely new, stream-



• Excavating old pavement and shoulder for patching and widening. Part of the New York U.S. 20 modernization. Madison County Construction Co., using Lorain shovel and Euclids.





- Two more examples of truck laning on U.S. 20; summit in the right-hand scene also cut down. Widening to 24 ft. is completed, binder course of resurface in place, feathered where necessary for crown correction. Bituminous surface course will be placed on truck lanes as well as main traffic lanes.

lined highways built to inter-state standards.

### 36-Mile Job

Sections of U.S. 20 from Auburn to Cazenovia, totaling 36 miles, were placed under contract during 1953 for improvement. This highway has carried a substantial truck traffic, and is also the principal access road to the Finger Lakes from the east. Traffic along different sections ranges from 4,526 to 6,086 for the 12 hour 7 a. m. to 7 p. m. August count, with peak

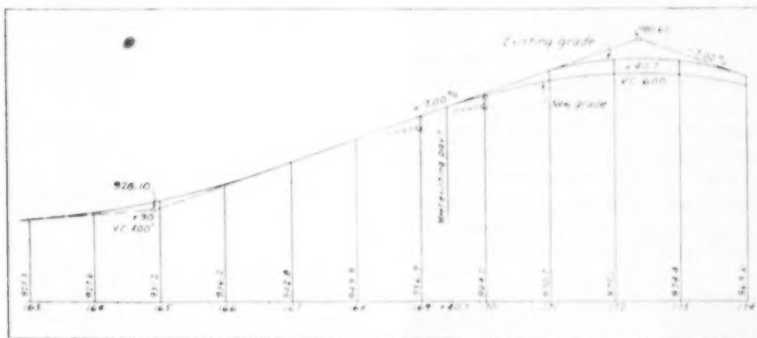
summer counts as high as 6,000 in 12 hours near such municipalities as Skaneateles—quite a load for a 2-lane highway.

What we have done, specifically, can be illustrated by describing the elements in the 10.95-mile contract section, Auburn-Skaneateles-Clintonville. This was awarded to Madison

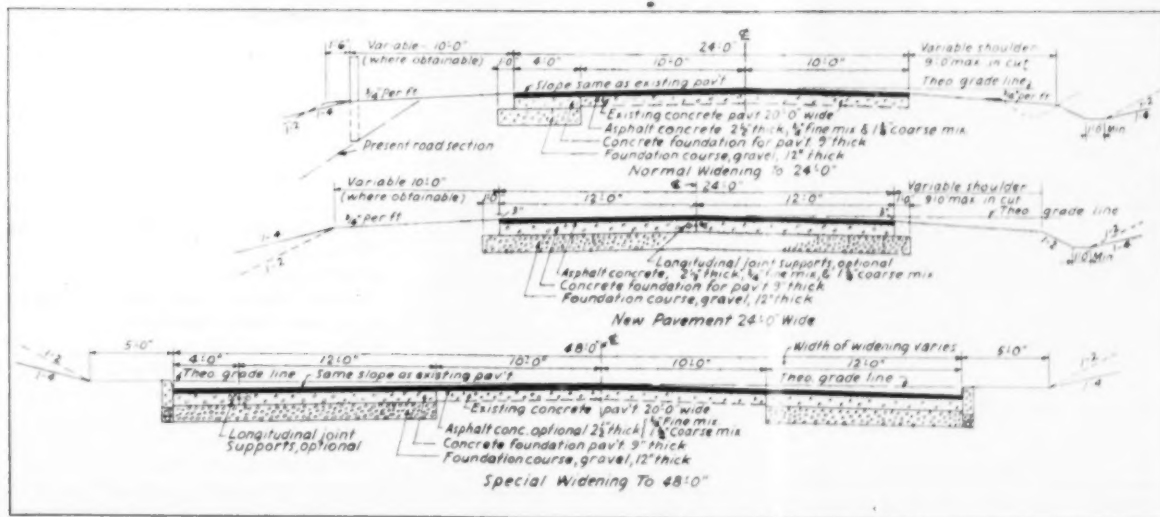
County Road Construction Co., of Madison, N. Y., at \$947,944.25.

Part of this section was built in 1929 and 1931 of reinforced concrete 20 ft. wide and 8 in. thick, and some of it carried a 2-in. bituminous overlay. Another part was built in 1933 to an 8-7-8-in. concrete thickness. A third portion consisted of stone

- Showing a typical summit, with previous existing and revised vertical curves. Such revision greatly improved sight distance.



- Typical cross-sections showing old and new pavement, U.S. 20, New York.





• (Left): Contractor's workers shoveling calcium chloride flakes on a crushed stone surface, as dust palliative in carrying traffic temporarily through short section of U.S. 20.



• (Right): Madison County Construction Co. used a Lorain truck-crane with clamshell to load cleared brush and stumps into trucks for disposal—to widen right of way.

macadam with bituminous topping. The prevailing rural width was 20 ft., with sections from 26 to 68 ft. wide in the village of Skaneateles.

The alignment was considered satisfactory for resurface without any modification.

There were several steep grades, the maximum ascending grades being 8.20 per cent westerly and 8.25 per cent easterly. It was seen that these grades could not be reduced because of their length, but considerable traffic relief could be afforded by cutting down some of the summits in conjunction with truck-laning.

One general provision was to widen the old pavement 4 ft., bringing the rural width to a prevailing 24 ft. For

this widening, 9-in. thickness of portland cement concrete was placed as foundation for a bituminous cover, with a 12-in. gravel subbase course. The bituminous resurface over the full 24 ft. consisted of two courses totaling 2½ in. thickness.

Revision in summits and addition of truck lanes were considered for each situation, to best provide added traffic capacity and safety. The procedure in some cases consisted of widening the existing pavement to 48 ft., to give truck lanes over summits on both sides, and in others of altering the grade and placing pavement either 24 or 48 ft. wide, depending on the added sight distance obtained.

Hill-top reductions imposed special problems at times. One was that of meeting the needs of adjacent farm house tenants. As shown in one of the accompanying photos, where farm houses existed along the right of way on either side of a summit, the cut widths had to be restricted in widening from 20 ft. to 48 ft. This was accomplished by the use of stone-filled concrete crib retaining walls (two such cases). Another photograph shows how a new access drive to one house was located at the cut end. Some curbing was built through the hill-tops to control drainage and minimize property damage.

Through the village of Skaneateles, improvement consisted of raising manhole covers, trueing the surface, and placing a bituminous overlay 1 in. thick.

Shoulder widths for the project were 9 ft. in cut and 10 ft. in fill, wherever it was possible to obtain these widths without making excessive cuts into high backslopes.

Existing drainage structures were retained and extended where necessary. Pipe underdrains were provided to drain wet spots in the roadway. Curbed portions of the road were



• This summit was cut down, repaved, and a third lane built which converges gradually into a two-lane pavement in foreground. Note that asphalt paver has completed two 12 ft. passes, using the outer edge of the converging lane (at right) as a guide. Remaining wedge-shaped lane was surfaced in a third pass.



• A four-foot widening strip has been placed along this section of old 20-ft. concrete pavement on U.S. 20 New York. A 12-ft. oscillating screed finisher (seen in distance) was used to place truck-delivered concrete.

drained by suitably placed catch basins outletting to natural drainage areas by means of pipes. Corrugated metal pipes were used in ditch crossings under intersecting roads, and installed under driveways adjoining the road where necessary.

#### Small Land Parcels Acquired

The project was not hampered by the necessity of cutting solid rock; soils ranged from clay to sand and silt to gravel. Twenty-five small parcels of land totaling 7 acres had to be acquired to secure additional strips

for cuts or fill widening. From the standpoint of conservation of investment, it is interesting to note that about 47,600 lin. ft. of the old concrete pavement was retained as a foundation for the overlay.

A second contract section immediately adjoining the afore-described section consisted of 11.2 miles from Clintonville to Lafayette. Dan Bar Contracting Co., Syracuse, N. Y., was awarded the contract at \$1,057,076.50.

This section was found by traffic count in 1951 to be carrying as high as 4,800 vehicles in 12 hours, with a one-way lane peak count of 264 per hour. The pavement built in 1933 and 1934 was in need of resurfacing to preserve the remaining investment and restore safe driving conditions. Again, the present alignment was found satisfactory.

As with the first project, a principal problem was the existence of long



• Careful attention was given to drainage in designing hill-top cuts and widening. Buried corrugated pipe drain (seen outletting into partially completed gutter) taps ditchline water through the cut. Curbs and inlets provided to minimize cut width and to control roadside erosion. (Note new farmyard access drive in background.)

A problem of all three contracts has involved the handling of traffic through the work. All traffic was

absent of adequate detours adjacent and parallel to Route 20. The contractor was required to maintain traffic to and from adjacent properties as well as for the traveling public.

During dry weather the traveled way was treated with calcium chloride to minimize dust nuisance. Where summits were cut down, or for other reasons traffic was forced to leave the pavement, the stone subbase was placed as quickly as possible to afford support.

The 36 miles of improvements in the three projects were designed and supervised by the Syracuse district staff of the New York State Department of Public Works. Edward Olschewski, Merrill Wrightmeyer and Raymond Butman are project engineers for the work, which is under the Syracuse District of the State Department of Public Works.

#### ROUTE U.S. 20 IMPROVEMENT CONTRACTS

Item Contract No. From—to	Contract 1 FARC 52-67 Auburn-Skaneateles- Clintonville	Contract 2 FARC 52-68 Clintonville- Lafayette	Contract 3 FARC 53-94 Lafayette- Cazenovia
Length—miles	10.95	11.21	13.91
Unclass. excav.	\$ 65,725.00	\$ 132,780.00	\$ 220,460.00*
Portland cement	\$122,888.75	\$ 96,449.00	\$ 241,759.50*
Conc. found. for pavt.	\$193,981.25	\$ 150,400.00	\$ 383,570.00*
Asph. conc. resurface	\$260,775.00	\$ 233,100.00	\$ 404,700.00*
Contractor	Madison County Construction Co.	Dan-Bar Con- tracting Co.	Bero Engineering & Construction Corp.
Contract amount	\$947,944.25	\$1,057,076.50	\$1,745,766.00

\*Estimated. No contract breakdown available as the contract was let August 6, 1953.

grades, which in this section were up to 10 per cent in either direction, with some valley crossings involving grades of nearly a mile in length. The worst summits were cut down, and one or two truck lanes added, concrete foundation was used in replacement areas or as widening, and a 2½-in. bituminous overlay placed. 58,400 lin. ft. of old pavement was retained as base. The 47 right of way parcels required totaled 9½ acres. This contract will be completed early in 1954.

A third project, extending the work on eastward to Cazenovia, 13.9 miles, was awarded to Bero Engineering and Construction Corp. at \$1,745,766. The requirements were similar, except for the addition of a 500-ft. line change to ease a sharp curve near a town. In repairing the old concrete in readiness for resurfacing, some bituminous subsealing will be performed. 53,000 lin. ft. of old pavement will be salvaged. Land parcels totaling 72 items covering 32.3 acres were required. To be completed, 1954.

maintained during construction. This was necessary because of the heavy volume of traffic and because of the

#### Bituminous concrete research



• A \$6,000 grant from the Bituminous Concrete Producers Association, Inc., of Ohio, will launch a long range program of research and development in the use of bituminous concrete at Ohio State University. L. P. Burgess (second from right), of Columbus, executive secretary-treasurer of the Association, presents the organization's check to University President Howard L. Bevis. At left is Dean Gordon B. Carson of the College of Engineering, and at right Prof. Emmett H. Karrer of the civil engineering department. Prof. Karrer will supervise the research study in Ohio State's Engineering Experiment Station. The grant was made through the University's Development Fund.



## Stripping evaluation

(Continued from page 95)

any exposure time (and perhaps any exposure conditions) can be found through the determination of this index under convenient standard laboratory conditions. The proposed actual mix must still be tested, but determining whether it met the strength required for the intended job under its particular exposure conditions would then become merely a matter of calculation.

Perhaps the doing of this stripping evaluation job completely and exactly, as indicated in the preceding comment, is expecting too much from the usual design organization just now, even though there is no step in it which is today impossible or even impractical. It will undoubtedly come in time. And there is no justification on the basis of current knowledge, for too long continuing to use visual stripping test procedures or similar in lieu of some sort of structural test approach.

## Meetings Ahead

**PURDUE ROAD SCHOOL**—Annual school, Purdue University, Lafayette, Indiana; April 19-22.

**FIFTH HIGHWAY TRANSPORTATION CONGRESS**—Sponsored by National Highway Users Conference, Washington, D. C.; May 4-6.

**NATIONAL ASSOCIATION OF COUNTY OFFICIALS**—Conference and Equipment Exhibition, Ak-Sar-Ben Coliseum, Omaha, Nebraska; June 9-12.

**AMERICAN SOCIETY OF CIVIL ENGINEERS**—Summer Meeting, Chalfonte-Haddon Hall, Atlantic City; June 14-19.

**UPPER PENINSULA ROAD BUILDERS ASSOCIATION**—Annual Meeting, Keweenaw Resort, Keweenaw County, Michigan; June 16-18.

**OTC Appoints Export Manager.** Owatonna Tool Co., Owatonna, Minn., has appointed Carlos V. del Mercado export manager. He has been identified with international trade for over 25 years and is thoroughly familiar with world markets.

**Holmes Joins Gorman-Rupp.** William T. Holmes, formerly with Douglas Aircraft Co., at Santa Monica, Calif., has joined Gorman-Rupp Co., Mansfield, O., as West Coast district manager, with headquarters in Arcadia, Calif.

**Dowd Consultant for Carver Pump.** William Dowd, an outstanding authority on centrifugal pumps, is now associated with the Carver Pump Co., Muscatine, Ia., as consultant. One of his duties will be re-designing and developing certain lines of Carver centrifugal pumps.

## New Books

### "Fundamentals of Asphalt Paving"

Published by the Ohio Oil Company, 1949

This book is an interesting deviation from the normal technical book on asphalts and pavement design, in that it is interesting reading. There has long been a need for such a book as this, to present the facts of materials and design, as information to the novice and beginner in asphalts and flexible pavements, and as reference material to the experienced engineer, yet with such presentation in good readable form.

The chapter on the antiquity of asphalt, although "lifted" from Abraham's "Asphalts and Allied Substances," is abstracted to maximum interest, as is also the discussion of the "lake pitches," through the Grahamites and Gilsonites to modern day refining processes of petroleum to obtain asphalt. The various tests used for asphaltic materials are explained adequately for the student and newcomer to the field, and furnish basic understanding for the terms used to describe and specify asphaltic materials.

Section II of the book presents the case for flexible type pavements, with both advantages and disadvantages frankly noted. This section should be of great value to the engineer or official in municipal or county work who has not had intimate contact with pavement practice, yet who make decisions on the type of pavement to be constructed with the usually limited funds available. The section particularly stresses dense graded paving mixes, their design and advantages.

Methods of designing various mixes for pavements are described in Section III. While the aggregate grading specifications would be of considerable help in designing such mixes, some of the methods described for determining asphalt content and stabilities appear to be outmoded by other methods now available. Considerable time is devoted to a discussion of surface area methods for determining proper asphalt contents of mixes, whereas recent practices lean toward stability and void content controls, which are probably simpler and more positive. The Marshall Stability, Hveem Stabilometer and several other methods, now widely used in mix design, are not mentioned, and in this respect, the reader needs other

references. However, the methods described are workable, and have a good background of reliability. For thickness design, the reader is referred to the California Bearing Ratio method, quoted from California Highway Department and the Cords of Engineers sources. The section on construction discusses briefly subgrade compaction, the priming of subgrades and base courses.

The maintenance of pavements, both flexible and rigid, are touched on lightly. Many of the procedures and materials described do not conform to practices over many areas in the United States and the engineer concerned with these items should compare the methods and materials described with local experience and usage.

The section on typical construction specifications furnishes an excellent general guide. Caution must be exercised in the application of some specifications due to local variations in materials and methods which may permit equally adequate construction with less restrictive requirements than those given in this section. In general practice, all "typical specifications" must be groomed for the particular conditions existing on a given project to obtain maximum benefits at lowest cost. These specifications are not exceptions.

In general, the book is well-written in an authoritative manner, and is of interest to the novice and experienced engineer alike. It is especially recommended to those engineers not having extensive back-ground experience, yet who must frequently design, construct and maintain asphaltic pavements. It's a good book for anyone's library.

## Hoiberg heads asphalt paving technologists

Dr. Arnold J. Hoiberg, Lion Oil Company, El Dorado, Ark., was elected president of the Association of Asphalt Paving Technologists at their annual meeting, Louisville, Ky., February 1-3. Other 1954 officers:

Vice-presidents: George Dent, Asphalt Institute, Washington, D. C.; and Carl Carpenter, Bureau of Public Roads, Washington, D. C.

Directors-at-large: George Beddoe, Ashland Refining Co., Ashland, Ky.; and J. R. Banning, Asphalt Institute, Denver, Colo.

Secretary-Treasurer: Ward K. Parr, Michigan State Highway Department, Ann Arbor (reelected).

Over 300 delegates and visitors, setting a record, attended the three-day meeting at Louisville.

### Bid Prices Again

The number of bids received per project on the Virginia state highway letting of January 27 averaged 8.5 contractors for each of the nine construction projects. Prices were down again . . . we venture to state that the average was 20% under the estimated costs of all of the projects. Normally your Association has no interest in prices because these are strictly the business of the individual firm bidding. We do like to see the industry kept on an even keel with a reasonable factor of safety in its margin of profit. It is difficult to incorporate such factors when the figure is running from 3 to 5 per cent. Let us exercise reasonable care, or we, like the shoemaker's children, shall be barefooted ourselves.—*Virginia Road Builders Association.*

### A political slant on highway administration

In reviewing current development of the Ohio highway employees' training program, S. O. Linzell, director of the state's department of highways, notes the weak as well as the strong spots in the project. Regarding the former, he says in part:

"During the four years we have been developing the Ohio Highway Training Program, we have noticed many weaknesses. One of them is the conflict between proper training and production. At present in Ohio the governor is elected every two years, and the highway director and staff are subject to change every two years. Consequently, the engineer and occupants of legislative positions are more worried about immediate production than long range training that will benefit the department in the years to come.

"It happens that the present administration has been continuous for over four years and will have at least two more years to run. I believe that if back in 1949 these men knew that they would be in authority until 1955 we would have had a little more emphasis on the training earlier in the program which would have given us better production at the present time.

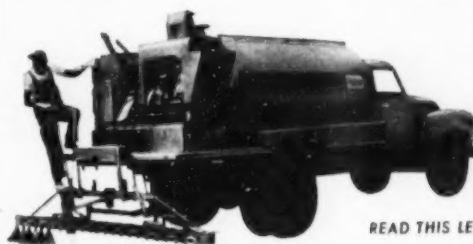
"We are still experimenting and trying new ideas in our program to achieve both production and training."

Mr. Linzell's paper was presented at the 39th annual road school (1953) at Purdue University and published in the PROCEEDINGS.

*To say that we are well pleased  
with our*  
**ROSCO  
DISTRIBUTOR**  
*would be stating  
it mildly!*



Ed M. Knott, Asst. City Eng. Muscatine, Iowa



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"We started our extensive road program last year and our Rosco was in constant use every day it was possible to work. We seal-coated 150 blocks of City Streets and in addition to this, constructed 36 blocks of road mix asphalt, besides oiling nearly 100 blocks of City Streets.

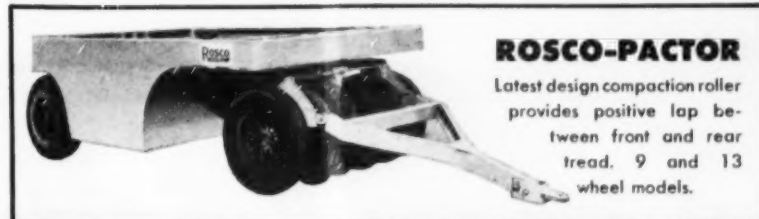
"During all this time we had only one minor breakdown on our Rosco which was taken care of in less than 2 hours time by our own mechanics.

"All of this work was done directly under my supervision and I feel well qualified to praise our Rosco as one of the best pieces of equipment owned by the City of Muscatine and we own nearly \$150,000 worth of street construction equipment of all makes.

"This year we are planning another heavy schedule of street improvements and when we start in a few weeks I entertain no fears as to what our Rosco will and can do for us."

- Uniform application through exclusive Pressure Metering
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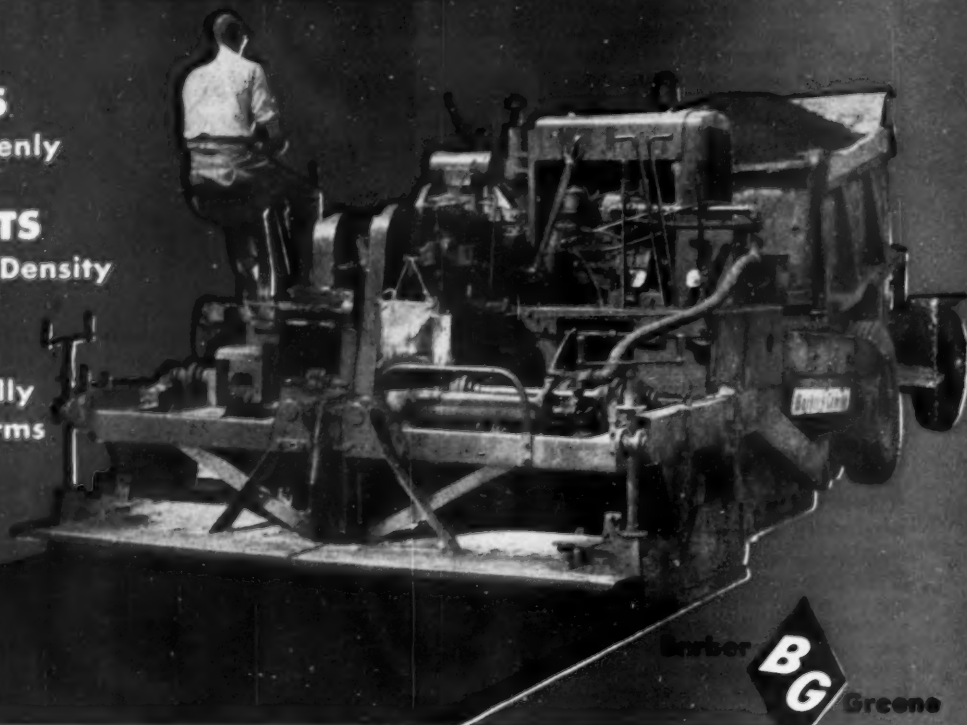
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With this superbly designed machine, you are able to lay every type of mix — hot or cold — from clay stabilized gravel to high-type sheet asphalt. Whatever type mat you are laying, the B-G Finisher automatically measures the correct amount of compacted material — then simultaneously tamps, levels and strikes off to produce a ripple-free surface that is maintained under rolling and

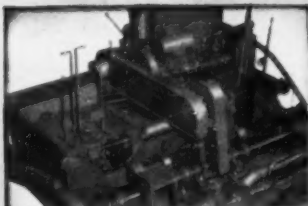
traffic. Because the material is compacted while it is being laid, you are assured of a surface of uniform density. And with the B-G leveling principle you compensate even for abrupt changes in the subgrade.

It will pay you to investigate this unequalled, universally preferred method of paving streets, highways, runways, parking lots, tennis courts and similar jobs. You will learn, for example, how the B-G Finisher saves truck time, minimizes rolling and reduces the size of crew. Investigate today!

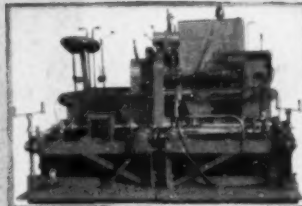
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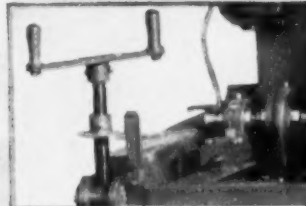
# features that mean MATCHLESS PERFORMANCE



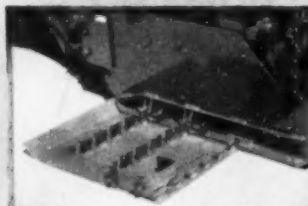
**DUAL CONTROLS** permit operation from either side depending on whether operator is matching a joint or following a guide line. Unobstructed view of mat edge. Foot-operated levers for feeding to spreading screw.



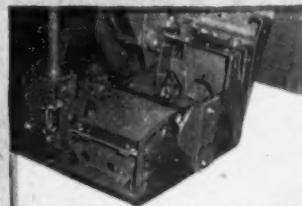
**HEATED SCREED.** For starting cold machine and maintaining temperature in cold weather, facilitates handling of materials not possible by any other method. Hot air blast with adjustable deflectors give safe, effective heat.



**MAT THICKNESS CONTROLS.** To change thickness, control tilts screed which gradually rides to a higher or lower level. There is no sudden change of mat thickness regardless of sub-grade variations.



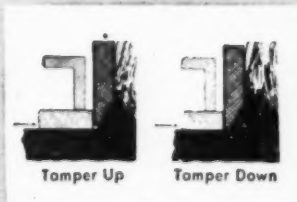
**CUT-OFF SHOES** of 1 and 2-foot widths are standard equipment. 10-foot standard width can also be reduced to 8 feet in 3-inch increments. Shoes can also be used with accessory extensions for reducing width.



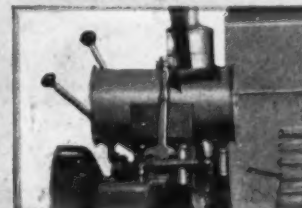
**ONE-FOOT EXTENSIONS,** added to either or both sides of standard 10-foot screed, increase laying width to 14-foot maximum. Cut-off shoes, left, adjustable in 3-inch increments, permit reducing mat to 12 feet without removing extensions.



**ADJUSTABLE HOPPER GATES** in 5-ton hopper plus individually operated feeders permit controlling the amount of mix reaching spreading screws and keeping the mix in motion. Three gates are quickly adjusted.



**SYNCHRONIZED TAMPER—1200** strokes per minute—assures uniform density of mat compensating for sub-grade variations. Reduces rolling.



**POWER HOIST** raises rear unit for traveling or maneuvering. Hoisting lever on top of machine is readily accessible from either set of controls.

## WRITE FOR BULLETIN

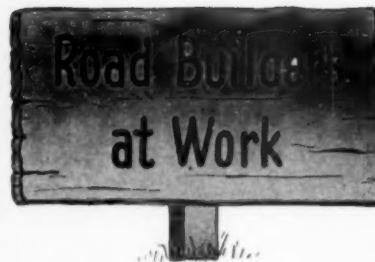
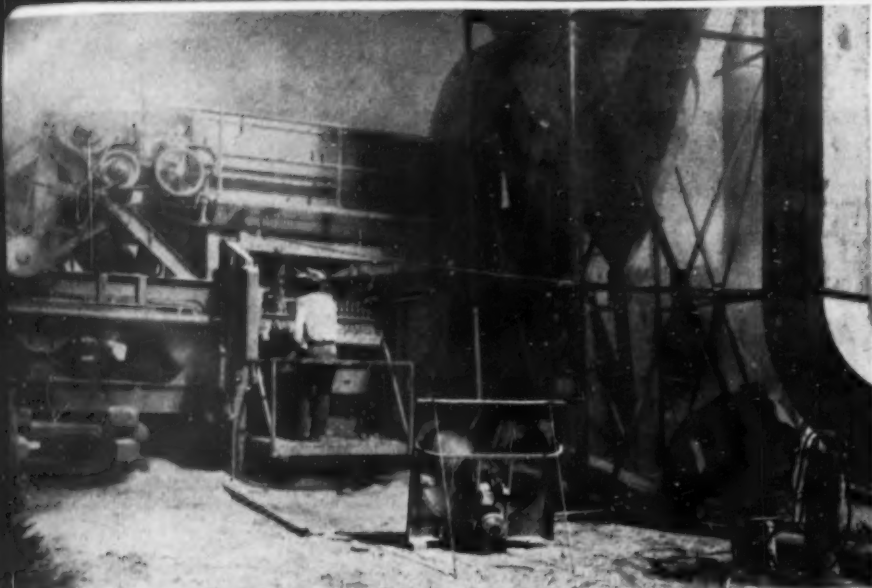
Get the full story. A booklet completely describing the B-G Finisher will be sent upon request.

276

# Barber-Greene

Aurora, Illinois, U. S. A.

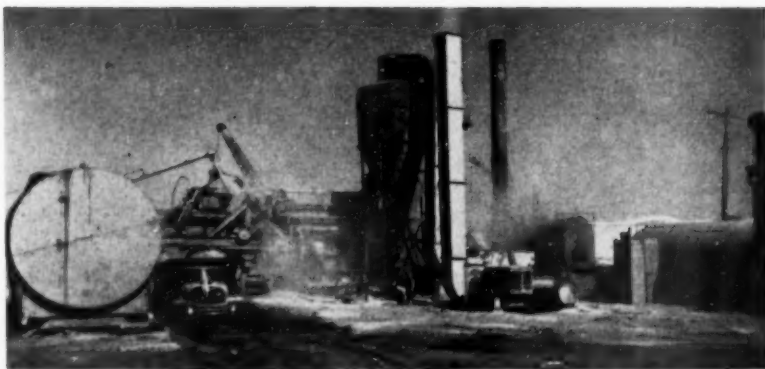




- The operator's station was located on the ground beside the plant. A large fan unit, also on the ground played on the operator to minimize dust. The fan also supplied heat relief when needed.

## WITH JAXON ON FLORIDA AIRFIELD

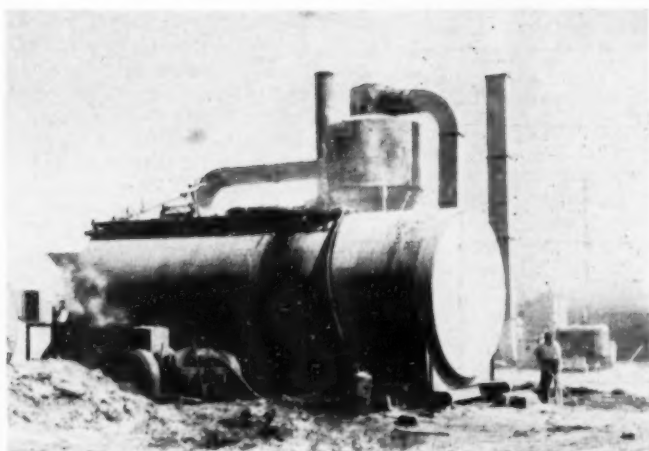
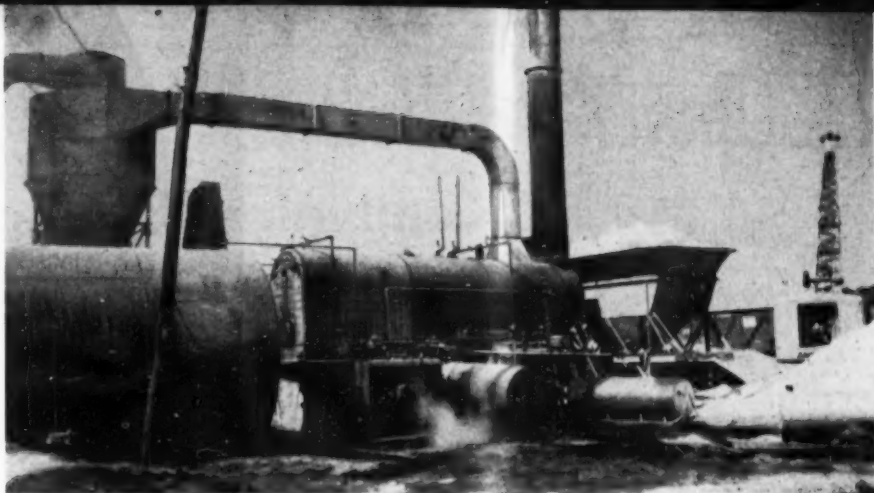
ONE of the many interesting combinations of equipment seen recently on Florida airfield work was the asphalt plant at Sanford, Florida, where pavement rehabilitation, strengthening and extension work were carried on in 1952 and 1953. Among the various contractors, Jaxon Paving Co., of Jacksonville, supplied 38,000 tons of asphaltic concrete for overlay. Herewith are snapshots and notes from the Editor's fieldbook.



- The Jaxon set-up at Sanford included a Cedarapids modified Model F. A. plant with 1 1/4-ton pug. International diesel power units.

- A major plant element was this Simplicity 18,500-gal. portable tank unit. Designed to store and supply asphalt, it has mounted on its frame a Kinney 4-in. steam jacketed asphalt pump, jacketed piping and hose connections, well for steam or oil heating coils.

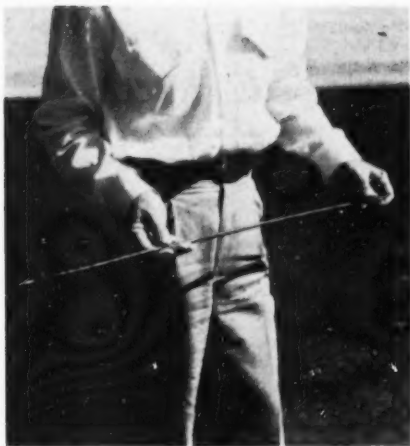
- The plant also included a Lucy 104 hp boiler, Byers Crane and American crane with Kiesler buckets supplying aggregate bins; Jenny Hyppressure steam cleaner for maintenance.



- (Left): Another view of the Simplicity asphalt tank unit, showing chassis skid frame (for trailer hauling) and piping details. A portable Grace asphalt pump, equipped with LeRoi motor and Twin-Disc clutch, used in conjunction.



- Ready to roll back to company headquarters—dump truck carried on Birmingham trailer with Mack truck tractor.



- Gauge stick devised for quick-testing of asphaltic overlay thickness during placement.

- Aggregates unloaded by a Barber-Greene car unloader, stockpiles built by an Allis-Chalmers HD10 tractor with Garwood dozer.





# Graphical Method for Combining Aggregates

*This method requiring only an engineers' scale and no computation has been extensively tested by the author on actual projects.*

**By J. ROGERS MARTIN**

Engineer-Manager, Hot Mix Asphaltic Concrete Association of  
Oklahoma, Inc., Oklahoma City

**S**PURRED by laziness, the writer has cast about for an easier method of calculating the combined grading of aggregates. None has been found that is actually easy, but a very simple application of analytical geometry does afford a graphical method, which is a time-saver in making these combinations. Although the writer has no knowledge of anybody else using this method, it probably has been employed by others who have never put it into writing. It would occur naturally to any one seeking an easy method.

Instead of plotting the grading of an aggregate in the usual manner, with the screen size as one ordinate and the percent passing as the other, the relative percentages may be laid off to scale on a single vertical ordinate, with the screen size designated for each percentage. This is illustrated in Figure 1.

For simplification, we may think in terms of pounds instead of percentages. Thus, the scaled grading in Figure 1 would represent 100 lb. of aggregate.

We may now mark a horizontal scale off to the left, reading from 100 to 0 lbs. of total aggregate and from 0 of this scale, draw a straight line, to the point already plotted on the vertical scale for each screen. Make a notation for each line to show what screen it represents. The result is a family of straight lines, shown in Figure 2-A.

## No Calculation

Presto! We have a picture which visually, and with no calculation, shows the general distribution of sizes in this particular aggregate. Also, as we shall see presently, it will automatically multiply, divide, and add for us.

Let us see what we can do with this chart. It has been drawn on graph paper with heavy lines each  $\frac{1}{2}$  inch

and ten lines per  $\frac{1}{2}$  inch. We may therefore use a "20" engineer's scale and "measure off" any quantity instead of fighting astigmatism to read the numbers off of the axis.

Suppose we want to know how much minus 4 material is contained in 45 lb. of total aggregate. Place the edge of the scale down vertically to coincide with 45 on the horizontal scale, bring 0 of the scale to coincide with the intersection of the No. 4 line and read 24.3 off the scale at the point where it intersects the horizontal axis. How much is retained on the No. 4 for 45 lb. of total aggregate? Slip the scale up so that "0" corresponds to the intersection of the uppermost line and read 20.7 at the point where it intersects the No. 4

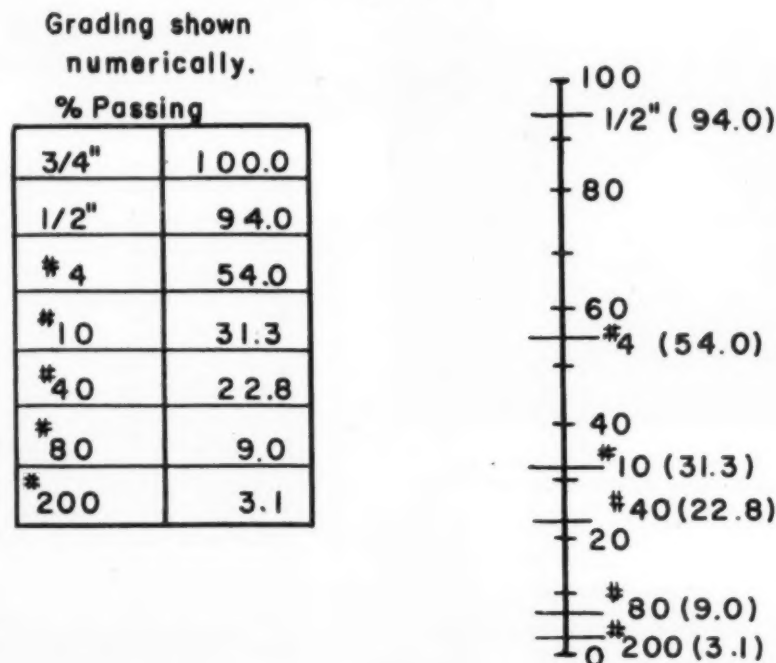
line. How much passing the No. 4 and retained on the No. 10 is there in 85 lb. of total aggregate? Place the scale vertically to interest 85 on the horizontal axis, adjust "0" of the scale to intersect the No. 4 line and read 19.3 at the point where it intersects the No. 10 line.

In each of the foregoing illustrations, we merely read the answer off of the engineer's scale which is obtained by multiplying the number of pounds (or %) of total aggregate by the fraction-percentage of the particular screen fraction in question. This operation is carried out repeatedly and to the point of frustration in the usual method of combining aggregates. Thus, in this respect alone the chart is a time and nerve-saver.

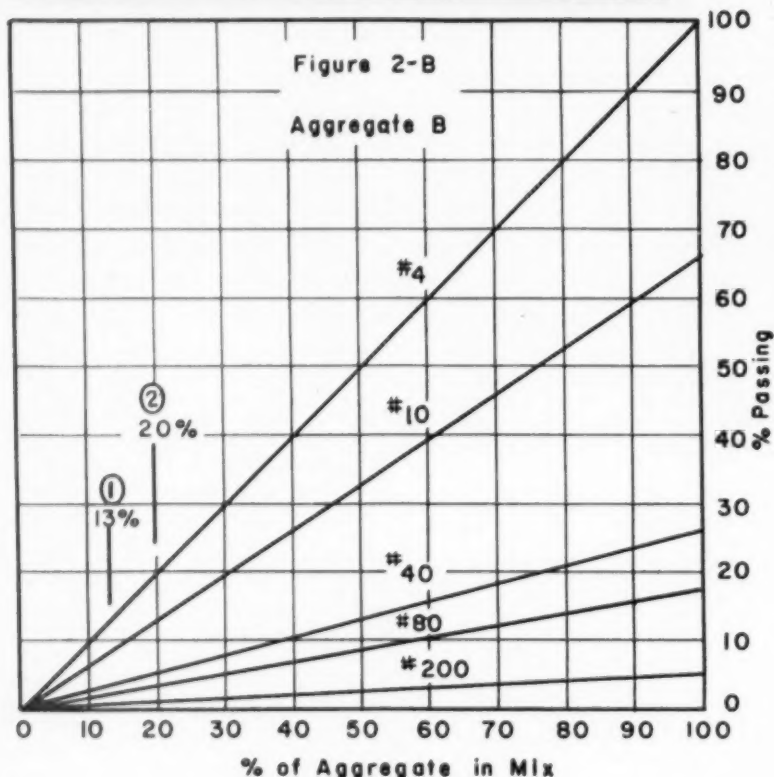
To proceed to the application of the graphical method for combining several aggregates, let us assume that we are to combine the three aggregates, A, B, and C, in Table I to comply with the grading limits shown. Make a chart for each aggregate as shown in Figures 2-A, 2-B, and 2-C.

Examining the mid-point grading (which we wish to reproduce as near-

**Figure 1**



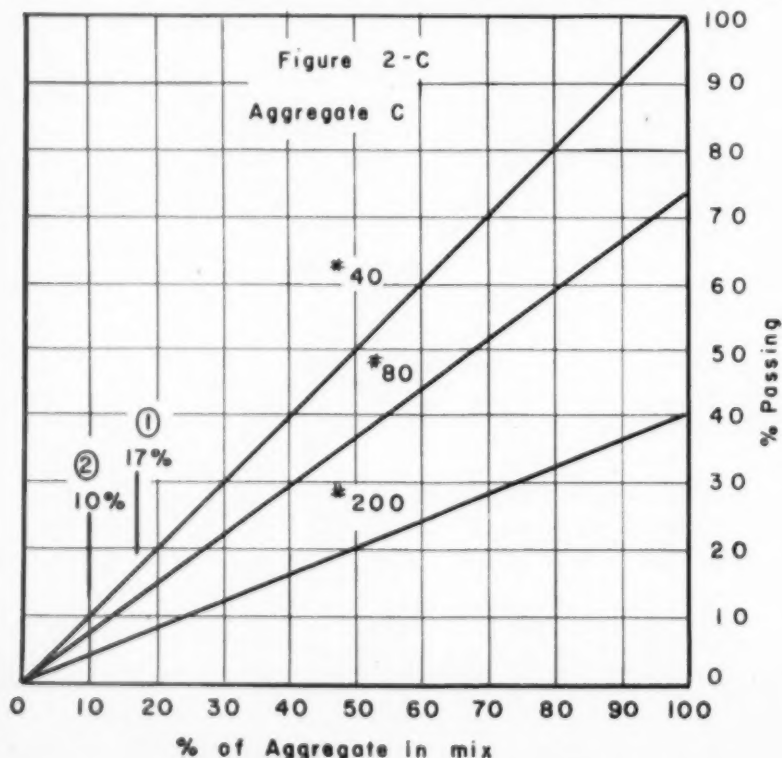




80 mesh sieve and then complete the first trial by determining the amount for the 200 mesh screen.

Examination of the grading obtained for Trial 1 shows definitely

that the combined mix is too fine. Inasmuch as the  $\frac{1}{2}$  inch, No. 4 and 10 screens are well adjusted, it is not desirable to make any change in the percentage of Aggregate A. It then



follows that we must have less of the very fine Aggregate C and make up for the difference with Aggregate B. Try a new trial combination of 70, 20 and 10, respectively. Now check the 200 mesh screen. By using our scale as previously outlined, we find that this combination will yield about 7.2% passing the 200 mesh sieve which is close to the amount we are after. Checking the other screens, we find that this combination will give a satisfactory grading.

Use of this method may seem quite clumsy on the first few trials. However, after one has become adept at the technique of "measuring off" the aggregate percentages with a scale, the combination can be completed with surprising speed. The writer used this method on many plant set-ups during construction of the Turner Turnpike and found it to be a great time-saver in combining hot bins to produce the desired grading.

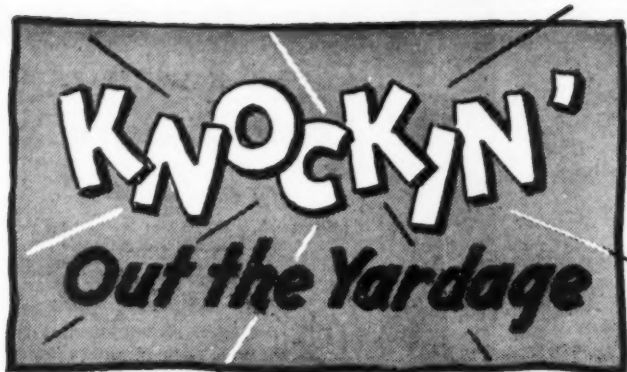
### Engineers' Scale Needed

It is evident that these charts could be utilized without the use of an engineering scale. The writer attempted this in his first efforts to apply the charts but found that it was very unsatisfactory.

The larger the vertical scale used in plotting up the aggregate, the greater the accuracy. If desired, graph paper with one heavy line per inch and ten lines in between, could be used in which case one would use the No. 10 engineering scale instead of the No. 20. In this case, the horizontal scale is made one-half that of the vertical scale so that it will fit on an 8½x11 sheet. However, it is the writer's opinion that sufficient accuracy is obtained by employing ½-inch graph paper and the No. 20 scale. If the lines on the chart are drawn carefully with a sharp pencil and due care is taken in making the scale measurements, the deviation from the calculated figures for the combined grading will seldom exceed 0.5%. Such a deviation is of little significance in calculated gradings.

The writer has tried several types of graph paper and has standardized on Keuffel & Esser Co. 358-11, 10x10 to the ½ inch, fifth lines accented. By marking off the ordinate in the exact center of the paper, two aggregates may be plotted on each page. The axes may be conveniently numbered and named, on a typewriter in advance. Thus, it is only necessary to lay off the gradings on the vertical scale and draw in the lines. After very little practice, one aggregate chart can be constructed in five minutes or less.





## Averages 228 Tons Per Hour With New Crushing Plant

**E**ARL AND LE ROY PLACE, material contractors of Scranton, Iowa, were among the first to capitalize the new Cedarapids Super Tandem aggregate plant developed recently by Iowa Manufacturing Co. Producing  $\frac{3}{4}$ -in. minus crushed gravel, and operating  $11\frac{1}{2}$  hrs. a day, the Place brothers averaged 228 tons per hour and produced as much as 3,560 tons in one day or 310 tons per hour during the past season.

Average per cent of crush was approximately 20%, with both wet and dry materials encountered since portions of the pit varied in moisture content.

The new machine has a 48 in. x 12 ft., two-and-a-half deck horizontal vibrating screen which is one of the elements permitting the high capacity reported. According to the Place brothers this big screen was particularly helpful in pits where there was a high per cent of fines or excessive amounts of soil, sand, clay or semi-wet material.

The plant conveyor and under-crusher conveyor for this installation were 30 in. wide. The primary crushing involved a 1,036 jaw crusher, with a secondary reduction by a 2,416 roll crusher.

### Scrapers do rechanneling in sandy riverbed

Rechanneling 16 miles of the Arkansas River at Wichita, Kan., these 15.5 yard scrapers are being used to remove the top 5 ft. of sand and silt lying above the water table.

The "Big Ditch" averages 100 ft. in width and 10 ft. in depth and the lower five feet will be mucked out with draglines. The scrapers belong to Badgett Mine Stripping Corp. of Madisonville, Ky., which firm is working the final 9 miles of the channel to be

completed in October, 1954.

The scrapers (Euclids) are loading the sand and silt in 45 seconds with one Allis-Chalmers HD 20 pushing, and in 25 seconds with two pushers. Hauls average 500 yd. with cycles averaging 3 to  $3\frac{1}{2}$  minutes.

### Contract bridge painting

The Virginia Department of Highways has asked the local contractor associations for lists of members who are interested in bidding on contracts for painting and cleaning steel bridges in 1954.

**Killebrew Elected Vice President:** Clarence E. Killebrew has been elected vice president of Clark Equipment Co., Buchanan, Mich. He formerly was manager for marketing and sales in Clark's Construction Machinery division. He will have similar responsibility in his new position, and will be in charge of sales and marketing of all products sold under the "Michigan" trademark.

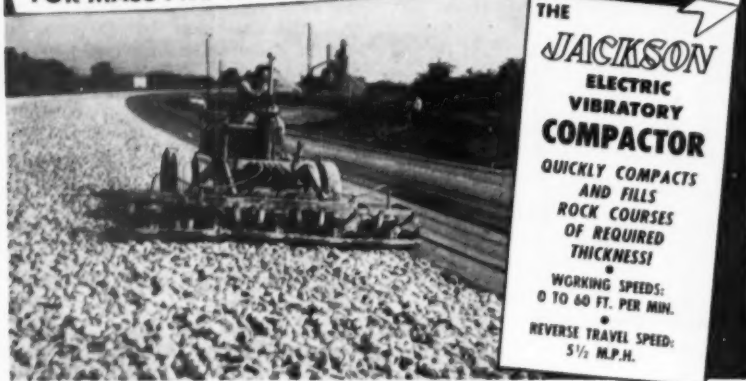


★ Rechanneling of Arkansas River in progress

★ One of the pit set-ups of Place Brothers, Iowa material contractors



**FOR MASS PRODUCTION IN MACADAM CONSTRUCTION!**



**THE JACKSON ELECTRIC VIBRATORY COMPACTOR**

**QUICKLY COMPACTS AND FILLS ROCK COURSES OF REQUIRED THICKNESS!**

• WORKING SPEEDS: 0 TO 60 FT. PER MIN.  
• REVERSE TRAVEL SPEED: 5 1/2 M.P.H.

**MACADAM**

The JACKSON — in one pass — will sufficiently compact 12 inches of rock to support smooth rollers. In four passes, the JACKSON keys and compacts to final density. It takes just two passes for the JACKSON to completely fill voids from top to bottom of the course, when enough dry fines are spread on top in one application.

**IN GRAVEL SUB-BASES**

(Blanket Course) 7" thick, at optimum moisture, the JACKSON in one pass has obtained densities exceeding 100% Standard Proctor. Vibratory frequency may be varied to suit conditions.

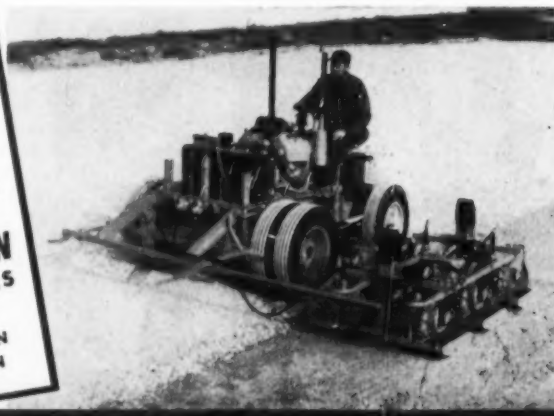
**FLEXIBLE**

The JACKSON is available in a standard width of 13', 3". Units may be subtracted on the job to meet conditions requiring narrower widths. The 26" units can be detached and fitted with handles, providing self-propelled compactors for restricted areas, pavement patching, paving drives, compaction of granular soils in trenches, etc.

**WIDENING STRIP COMPACTED IN ONE PASS**

With simple equipment available, compactors may be assembled in tandem, 3 deep and in single or double row, and towed at the side of the tractor to give complete compaction of widening strip in one pass in all granular materials used for flexible base-course widening. Compactor bases of 12" width and up may be substituted for the standard 26" bases to fit any widening requirement.

*See*  
**YOUR JACKSON DISTRIBUTOR OR WRITE**  
to us for details of this extremely versatile, multi-purpose, money-making equipment.  
**JACKSON VIBRATORS INC.**  
LUDINGTON MICHIGAN



## Simplified Method Gives Radius of Existing Curve

By John E. Oliver

Engineering and Technical Services Division  
Bureau of Yards and Docks

Reproduced from the C.E.C. Bulletin

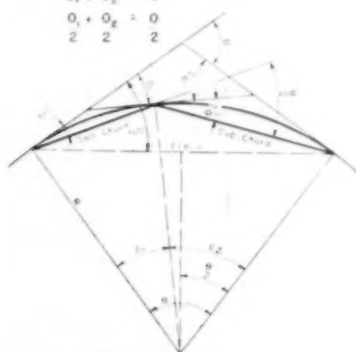
**T**HE problem: To determine the radius of a circular curve on an existing road or railroad where the original location data is unavailable.

This problem is often encountered by land surveyors and by field engineers on projects involving revisions or additions to roads or railroads. The generally accepted solution is both cumbersome and laborious. It involves coordinating between three selected points on the arc; coordinating to the midpoints of the chords; inverting between these midpoints and dropping perpendiculars to the curve center! solving the oblique triangle thus formed and the right triangles on either side.

The problem is greatly simplified by employing the following axiom (figure below gives geometric proof of the axiom):

**GEOMETRIC PROOF OF AXIOM**

$$\begin{aligned} O_1 + O_2 &= 0 \\ O_1 + O_2 &= 0 \\ 2 \quad 2 \quad 2 \end{aligned}$$



The external angle at the intersection of two chords connecting three points on an arc equals one-half the central angle subtending the complete arc limited by the chords.

The figure on next page illustrates the use of this axiom in determining *R*. First locate three points, *A*, *B* and *C*, on the centerline of a road, or on the gage line of the inner or outer rail of a railroad, and at random positions longitudinally.

1. Measure subchord distances *A-B* and *B-C*.
2. Measure external angle at intersection of subchords *A-B* and *B-C*.
3. Solve triangle formed by *A-B-C*,

# NUMERICAL EXAMPLE

FROM FIELD SURVEY DATA LOCATING THREE POINTS (A,B,C) ON AN ARC

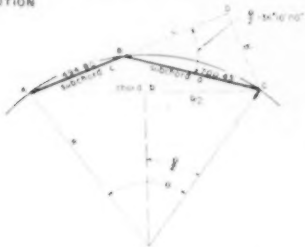
## GIVEN

LENGTHS - SUBCHORD  $b = 700.43'$ , SUBCHORD  $c = 494.80'$   
EXTERNAL ANGLE OF INTERSECTION OF CHORDS A-B,  
 $\theta = C = 36^\circ 11' 00''$  (SDBC)

## ESTABLISH

RADIUS OF CURVE (R)

## SOLUTION



SOLVING FOR R: RESOLVE INTO RIGHT TRIANGLES BEC AND ADC

GIVEN  $\angle CBD = 36^\circ 11' 00''$ ,  $c = 494.80'$ ,  $b = 700.43'$

SOLVE FOR  $e$  AND  $d$

$e = b \cos 36^\circ 11' 00'' = 700.43 (\cos 36^\circ 11' 00'') = 565.46'$

$d = b \sin 36^\circ 11' 00'' = 700.43 (\sin 36^\circ 11' 00'') = 413.35'$

SOLVE FOR CHORD  $b$

$\tan \angle CAD = \frac{d}{e} = \frac{413.35}{565.46} = 0.7310572$

$\angle CAD = 36^\circ 11' 55''$

$R = \frac{e}{\cos 36^\circ 11' 55''} = \frac{565.46}{\cos 36^\circ 11' 55''} = 887.00'$

SOLVE FOR  $R$

$R = \frac{b}{2 \sin \frac{\theta}{2}} = \frac{700.43}{2 \sin 18^\circ 05' 30''} = 964.17'$

NOTE: THE ABOVE METHOD OF SOLVING TRIANGLE ABC IS CONSIDERED TO BE MORE EASILY ACCOMPLISHED IN THE FIELD, DUE TO THE LENGTHY COMPUTATIONS INVOLVED BY THE USE OF THE LAW OF COSINES.

using two subchord distances and external angle.

4. Applying the well-known formula  $LC = 2R \sin \frac{1}{2}\theta$  and solving for  $R$ , we have

$$R = \frac{\frac{1}{2}C}{\sin \frac{1}{2}\theta}$$

in which  $C$  = chord A-C;  $R$  = radius of centerline

$\theta$  = central angle subtended by arc A-C

$\frac{1}{2}\theta$  = external angle at intersection of chords A-B and B-C

## Bituminous tonnage gains in New York road work

Bituminous concrete tonnage supplied the New York state department of public works during 1953 is reported as follows from members of the Bituminous Concrete Producers Association: Special projects 253,602 tons; maintenance 133,528 tons; construction and re-construction 927,250 tons; total 1,314,380 tons.

The total figure represents a slight gain over 1952 and a doubling of tonnage since 1950. The materials consisted chiefly of New York state specification type 1-A mix with a scattering of other mix types, as reported by Gus Rayner, Executive Secretary of the Association.

Karste Made District Sales Manager. Roland Karste has been appointed district sales manager for the Detroit office of The Hell Co., Milwaukee, Wis. He succeeds the late Fred W. Ehlert.

# What more could We say ?

## From the General Office of INDUSTRIAL ASPHALT

April 14, 1953

Mr. M. B. Freeman, Vice President  
Standard Steel Corporation  
P. O. Box 15252  
Los Angeles 58, California

Dear Mr. Freeman:

I would like to take this opportunity to thank you and your organization for the wonderful cooperation and prompt services rendered in connection with the purchase, construction, and installation of our new Standard Steel, Model R B, electric driven asphalt plant at our location in Sun Valley, California.

This new Standard Steel plant was officially christened on April 11th, 1953 and went on commercial production April 13th, 1953. Our plant manager at Sun Valley, Mr. Frank S. McGinnis, reported today that this new plant was running at full capacity and with more ease, speed and efficiency than any of our other four Standard Steel plants in the Los Angeles area.

Our employees like this new plant so much they are all fighting for priority to be transferred to its operations.

I would be very ungrateful not to express my appreciation for the help your engineering department gave to our superintendent during the course of assembling this great plant.

Yours very truly,

INDUSTRIAL ASPHALT

By

W. E. Hunt, Its Executive Manager



Join the hundreds of completely satisfied users of Standard Asphalt Plants. Speed your operation - decrease your maintenance and operation costs - increase your profits the Standard way.

UNIT BUILT - 8 SIZES, 500 to 6,000 pound batch capacities.  
WRITE TODAY FOR FULL DESCRIPTIVE LITERATURE

## STANDARD

## STANDARD STEEL CORPORATION

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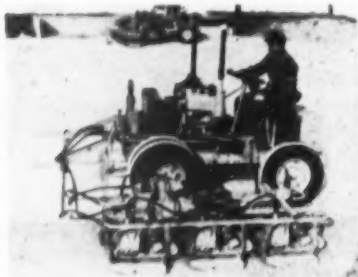


# WHAT'S NEW

## in EQUIPMENT and MATERIALS

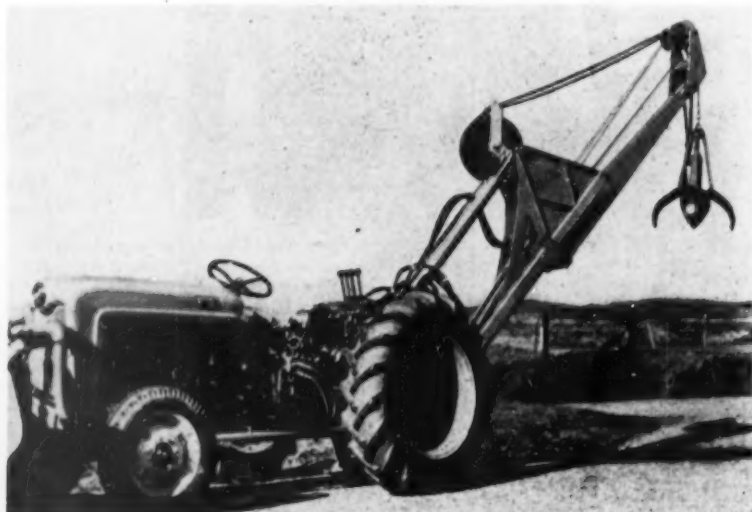
### Tamper Widens Base Course

Jackson Vibrators, Inc., Ludington, Mich., producers of the Jackson multiple vibratory tamper, which it is said has found favor as a medium for keying and filling rock base courses in macadam road construction now announces the ready adaptability of this machine to the consolidation of all materials normally used in flexible base course widening.



Tampers on Base Course Widening

In this application the six vibratory compactor units, which are normally mounted ahead of the tractor for standard road construction, are assembled in tandem (single or double row) with frame available from the manufacturer, and towed at the side of the tractor over the widening strip. With three compactors in tandem (single or double row) complete compaction is stated to be achieved in one pass.



Pippin Excavator with Catch Basin Attachment

### Catch Basin Attachment

A catch basin attachment for the Pippin excavator has been announced by Pippin Construction Equipment, Inc., White River Junction, Vt. This attachment mounts on a standard excavator.

With the dipper stick of the excavator fastened in position, its hydraulic cylinder is used to operate the cable and sheave mechanism which rapidly lowers the orange peel bucket to a maximum depth of 19½ ft. below the ground level. The

*On bound-in post card please fill in description of item on which more information is desired. The card is provided for your convenience in making inquiry and in obtaining catalogs or other data. Card works for both advertising pages and reader items.*

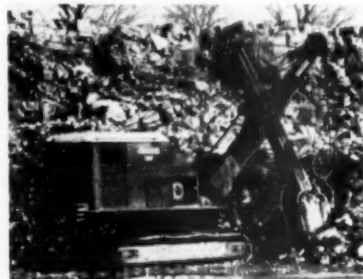
*Drop post card into outgoing mail. No stamp is required.*

bucket, opened and closed by a double acting cylinder, is easily filled and raised to 9 ft. above ground for loading directly into a truck. Mounting or dismounting this attachment requires only an hour or so.

Other features consist of end folding, positive lock which holds the folded ends when traveling and quick acting coupling which make the removal or addition of spray bar sections easy and quick. The spray bar is claimed to weigh ¼ less than ordinary spray bars and is easily handled without effort by one man.

### 2-Cu. Yd. Combination Machine

Model 920, a new 2 cu. yd. shovel, hoe, dragline, clamshell and crane combination machine has been added to the line of Osgood-General, P.O. Box 515, Marion, O. In its design, the Model 920 includes those



O-G Model 920

basic, time-tested Osgood features, Osgood air control, with patented air tube clutch, which permits the operator to obtain the ultimate in smoothness of operation, through metered air power.

Deck is one-piece, unit cast-steel construction, providing a rigid sturdy base for the operating machinery. The deck side frames are of cast steel, holding the horizontal shafts in fixed alignment. Cab gives complete protection to all parts, and is designed to give the operator full vision of his work, and protection from the weather. Standard shovel boom is box type, of high strength, low alloy steel, 23 ft. long, with an 18-ft. dipper handle. Independent chain crowd, with two-piece chain, is self-adjusting to any boom angle. Crowd and retract sprockets are mounted on the drum in two pieces.

Conversion from shovel to other class of service in the field is rapid and easy. Standard engine is the GM 6-71 diesel. Torque converters (optional) may be added to the power unit, for the highest degree of operating smoothness.

### Air Entraining Agent for Concrete

After years of field and laboratory testing Dasco Chemical Co., Inc., 1602 Thames St., Baltimore 31, Md., has developed a new air entraining agent for concrete known as Dasco Dastrex. Dastrex contains no inert fillers, and is claimed to mix immediately when applied to the mix, with the result that concrete flows more freely and requires less spading, roding, and vibration. Dastrex is claimed to make concrete approximately 400% to 500% more resistant to weathering, abrasion, frost and sea water. This material is stated to render concrete watertight by increasing its density. When added to concrete Dastrex is said to give 3% to 6% of air entrainment to the concrete.

## Reinforced Abrasive Blades for Masonry Saws

Entirely new reinforced abrasive blades for use on masonry saws have been announced by Robert G. Evans Co., 6315 Brookside Plaza, Kansas City 17, Mo. They are marketed under the trade name Target "Safety-Blades." It is claimed the blade readily take severe flexing, side pressures and bumping while in action. The blade is the result of an entirely new process which moulds a strong center core of strongly woven synthetic fabric. A variety of specifications are being manufactured to provide fast, economical cutting of brick, stone, concrete blocks, tile and refractories. Cutting action is claimed to be extremely free, and fast.

## Cab for Tractor Shovels and Tractors

A new line of streamlined operators' cabs for all models of Payloader tractor shovels has been announced by Campbell Detachable Cab Co., Wauconda, Ill. These



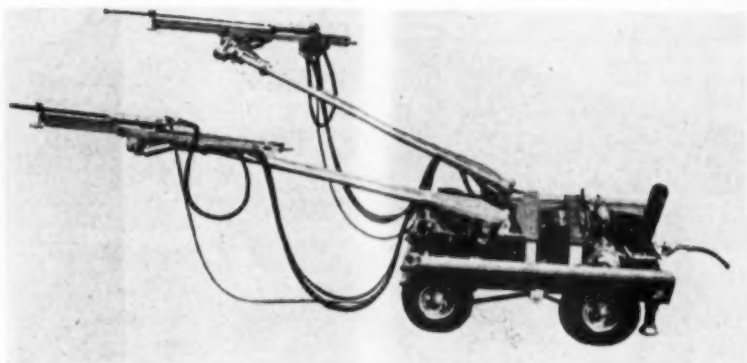
Campbell Cab on Payloader

new cabs are easily detachable and feature strong, lightweight construction with safety glass all-around for maximum visibility and safety. The glass is cushioned and sealed in locking rubber channels. Ample room is allowed for the operator, and sliding side windows permit full ventilation when desired. These new cabs tilt up and sideward so as to make operator entrance and exit both easy and convenient. Campbell 1954 model cabs are also available for most standard makes of crawler and wheel-type tractors.

## Priming Fluid for Quick Starting

A new pressure pack for priming fuel has been developed by The California Oil Co., Barber, N. J., to quick-start all types of heavy duty internal combustion engines in temperatures as low as 65 degrees below zero. Called the Pressure Primer System, the starting aid uses Chevron priming fuel packaged under 250 lb. of pressure in a 9.9 cc. steel bulb.

The fluid is a highly combustible material that permits the engine to run until it can build up enough heat to operate on the regular fuel. The operator controls the release of the bulb from the cab by means of a discharger installed on the engine control panel. When priming fuel is needed the bulb is placed in the discharger, a lever is pushed and the discharger pierces the sealing cap of the bulb and directs the priming fuel through a small tubing connected to the engine intake.



Gardner-Denver JSP Mobiljumbo

## Self-Propelled Drill Jumbo

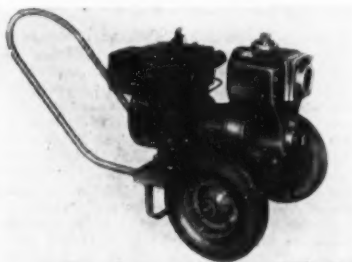
A new self-propelled "Mobiljumbo," announced by Gardner-Denver Co., Quincy, Ill., has complete remote controls. All positioning and drilling operations are controlled from finger-tip console panel. One operator can move into position and drill out a complete round in drift, tunnel, room, quarry or rock cut, without leaving his seat on the Jumbo carriage.

Positioning of the booms and drills, as well as the complete drilling cycle, is handled by hydraulic controls conveniently grouped in front of the operator. One lever on each side of the control panel raises or lowers the machine on jacks for stability while drilling. Another set of levers raises or lowers each boom independently, while other levers swing the boom laterally.

Drills are positioned by hydraulic cylinders near the end of each boom and these cylinders are also operated by levers at the control panel to move the drills through vertical and horizontal arcs. Drills can be positioned for down holes or up holes, as well as for horizontal holes.

## Portable Pumps for Water Drainage

A completely new and improved line of self-priming contractors' type centrifugal pumps, announced by Jacuzzi Bros., Inc., Richmond, Calif., are specially built to handle muddy or unclear water. The improved design features a balanced type of priming port which prevents loss of capacity due to 4-circulation of water. Semi-open impellers are non-clogging with adjustable clearance to compensate for wear; and a special renewable impeller wear



Pump with Trailer

plate prevents wear on the impeller case itself. Separate opening in top of case permits easy priming without need for extra fittings or disturbance of piping.

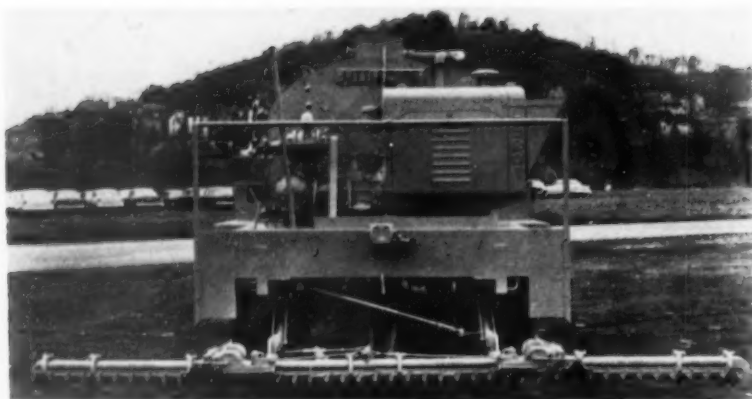
## 8 1/2 Ton Capacity Dump Body Hoist

A new 8 1/2-ton capacity dump body hoist has been announced by The Gallon Allsteel Body Co., Gallon, O. Known as Allsteel Model 740, the new unit weighs 1025 lb. Capacity is rated on the basis of a 10-ft., 4-yd. dump body. Model 740 features include an all-steel subframe with underbody double lift arms. Piston rod diameter is 2 1/2 in. and stroke is 19 1/4 in. There are 4.3 gal. of oil in the hydraulic system,



Allsteel Model 740 Hoist

and piston stroke oil displacement is 765 cu. in. Cylinder diameter is 7.156 in. Mounting height is 14 in. and hoist has a 50-degree dump angle. The hoist is equipped with a heavy duty pump which can be applied in either vertical or horizontal position.



Littleford Bituminous Spray Bar

### Spray Bar Simple in Operation

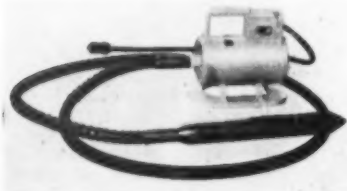
A new spray bar, engineered to simplify spraying of asphalt, tar, emulsion, road oils and cut back, has been announced by Littleford Bros., Inc., 454 East Pearl St., Cincinnati 2, O. This spray bar, designed for use on the Littleford "Spray Master" and "Spray King" bituminous distributors, is mechanically operated full circulating up to 24 ft. in width.

Simplicity of operation is an important feature, pulling a lever all nozzles spray in unison, by pushing the same lever the nozzles stop spraying instantly with no drip. Half the bar, or any length of bar will spray. Each nozzle has an individual valve and the nozzles are spaced on 4 in. centers. Mechanically operated bar gives complete double-lap spray.

### Concrete Vibrator Has Increased Impact

A new model concrete vibrator, with increased power and impact, has been announced by the White Manufacturing Co., Elkhart, Ind. It will be known as Model ME-13, and is designed to maintain its "kick" and speed in densest of concrete. This unit is powered by a new small universal motor, rated at 2 hp but developing almost 2½ hp, which operates at high speed on 110-volt alternating current of any cycle, and on direct current. It does not require a special high cycle generator.

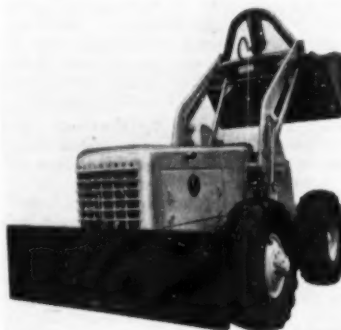
Increased impact, for faster vibration and placement of concrete, is obtained with heavier off-center rotor and without excessive speed. Normal speed is from 7,500 to 8,000 rpm, which minimizes wear and prolongs life. As with all White vibrators, the head is driven by fully interchangeable drive sections of 7 ft. and 12 ft. lengths. No special section is required for vibrator nor for attachment of grinding spindles.



Model ME-13 Concrete Vibrator

### Tractor-Shovel Accessories

Two useful pieces of accessory equipment for its "Payloader" tractor-shovel have been announced by Frank G. Hough Co., 768 Seventh St., Libertyville, Ill. One of these is a wide pusher plate of heavy rolled steel for rear-mounting so that the machine can push stalled trucks and other equipment and spot railroad cars. This pusher plate also includes a retractable towing link, so that this 1½-cu. yd tractor-shovel can tow, haul or skid loads. Where



"Payloader" with Pusher Plate

it is desirable to use the Model HM as a prime mover to haul hydraulic-controlled scrapers, wagons, rotoers, etc., a set of hydraulic connections and valves can be installed for control of the hauled equipment.

### "Armored Joint" Pipe

A special type joint, long-used successfully on pressure pipe, is now available on reinforced concrete sewer pipe manufactured by Universal Concrete Pipe Co., Columbus, O. Universal has trade-marked the name "Armored Joint" to identify the new pipe, which combines steel joint rings and long-lasting rubber gaskets that insure against leakage or infiltration. The rings, embedded in the concrete pipe wall, are welded to the pipe's steel reinforcement. The rubber gasket is seated in a special groove in one ring so it is confined and protected. The complete joint is said to provide ample flexibility to allow for normal contraction, expansion and deflection.

### Street Light for Wide Boulevards

A new street light, designed for wide boulevards, "white way" shopping areas or resort boardwalks, is being readied for mass production by Westinghouse Electric Corporation, Lighting Division, Edgewater Park, Cleveland, O. Called the "OV-60," the new unit accommodates either a 700 or 1000 watt mercury or fluorescent mercury lamp. Body and reflector are aluminum.



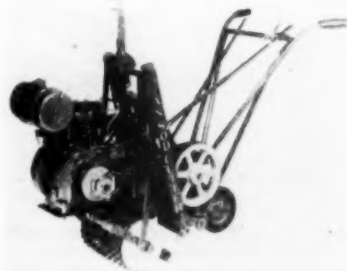
OV-60 Street Light

The street light, mounted at a tilt of 15 degrees, will provide a uniform distribution of bright light on boulevards up to 125 feet wide. When using the 1,000 watt mercury lamp, the street light provides more light on the roadway than does any other street light ever built, according to Westinghouse engineers. The new OV-60 first has been installed as part of Atlantic City's new boardwalk lighting system.

### Sod Cutter

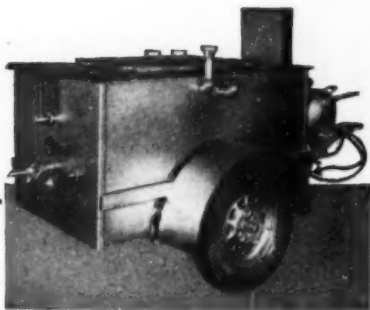
An improved Ryan power sod cutter has been introduced by K and N Machine Works, St. Paul, Minn. Operating with a 6 hp Wisconsin AKN or Briggs-Stratton Model 14 engine, the Ryan S-1 is stated to move along at the rate of 100 ft. per minute, easily cutting 4,000 or 5,000 sq. yd. of sod per day. The operator has handle-mounted complete finger tip control.

The S-1 is available in three standard widths: 12 in., 15 in. and 18 in. The Ryan "Coulter" model has all the features of the standard sod cutter—plus the coulter type disc which cuts the runners of "creeping" type grasses ahead of the oscillating cutting blade. It provides for cutting sod cleanly without tearing, pulling or fouling with grass roots.



Ryan S-1 Model Sod Cutter





### White Oil Jacketed Kettles for Heating Elastic Joint Filler

Joint filling compounds containing rubber, for elasticity, must have indirect heat application. They melt at 375° and must not exceed 425°. White Model F-10 kettles maintain this temperature accurately by an oil jacket which transfers heat to the compound.

White kerosene burners are safe and dependable, easily controlled. Hand operated agitator. Insulated housing.

Other models for pavement maintenance have FIRE-PROOF tops. Hand or engine sprayers. Made in several sizes.

Write for Catalog

Elkhart, 20, White Mfg. Co. Indiana

### Hoist for Pickup Trucks

A new model "Universal Mount" Dump-O-Matic hoist for use on 1/2, 3/4 and 1 ton pickup chassis has been announced by National Lift Co., Ypsilanti, Mich. The new Dump-O-Matic is engineered so that a single hoist model can be quickly adapted to any truck chassis with a simplified kit of mounting brackets. Mounting time has been reduced up to 20%, compared to that required for previous models. The twin cylinders of the "Universal Mount" Dump-O-Matic are low slung between the truck chassis frame to permit a lift point well ahead of the body hinges, greater leverage, easier hoist work, for longer, useful trouble-free service.



Dump-O-Matic Hoist on Pickup Truck

### Heavy-Duty Double Impeller Impact Breaker

Another addition to the Cedarapids line of double impeller impact breakers has been announced by Iowa Manufacturing Co., Cedar Rapids, Ia. The new Model 536OH, designed for high capacity in heavy-duty applications, now makes the Cedarapids double impeller impact breaker available in six sizes. Model 536OH is a larger, heavy-duty design incorporating most of the features found in the smaller size double impeller impact breakers. The new unit weighs 168,000 lb. and is 60,000 lb. heavier than the standard Model 536OS, formerly the largest unit in the line and known as the Model 5050. Capacities of the Model 536OH range from 500 to 800 tons per hour of 4 in. minus prod-

# Remember When?

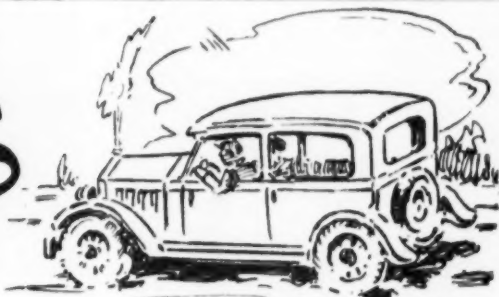
And do you remember when you used to send your truck for some "Cold Patch," cross your fingers, and hope that some of the patches from the load would stay put for awhile?

## THANK GOODNESS FOR PROGRESS

The use of KOTAL STOCKPILE has eliminated the crossed fingers and waste formerly associated with street and highway maintenance.

When you use KOTAL STOCKPILE MIX, you know you have a patch that STAYS PUT! If you haven't yet tried the KOTAL STOCKPILE MIX, you should do so NOW.

Prove to yourself that the KOTAL MIX is truly outstanding in performance and that only KOTAL MIX HAS THAT ADDED QUALITY THAT INSURES BEST RESULTS.



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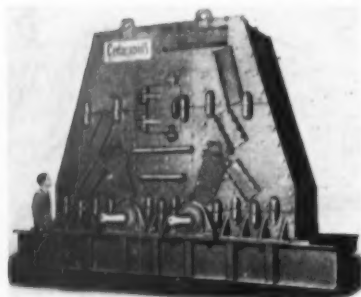
*Write us for more information and the name of our nearest jobber*

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Model 5060 Impact Breaker

uct, depending upon the type and characteristics of the material processed. This impact breaker can be fed with material measuring as much as 5 in. x 60 in. in size, with reduction to a minimum size of 3 in. minus in one pass.

## Portable Heater for Out-Door Work

A new, large mobile heater for heavy duty out-door drying, such as on highways, culverts, foundations, and for thawing frozen aggregates, has been announced by Bealer Corporation, Oakland, Calif. One of the outstanding features, according to the manufacturer, is its ability to heat large areas completely and uniformly. The Bes-D-Frostr is a blower type heater with axial fan, and is available powered by gasoline engine or electric motor. It rap-

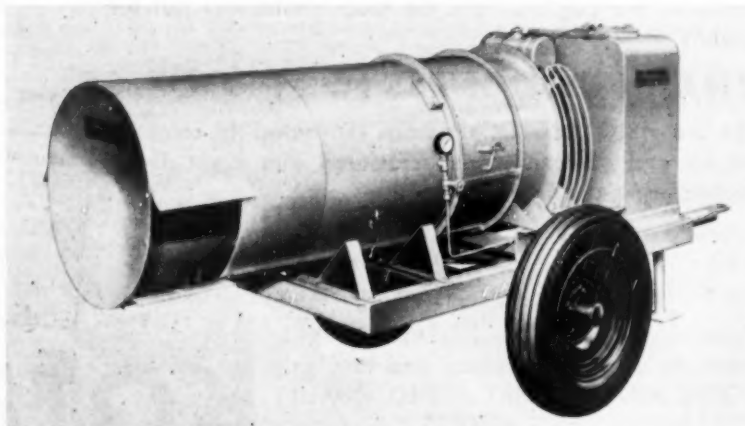
idly heats and distributes warm air in a controlled pattern without creating isolated "hot spots." It is capable of producing 1 to 4 million BTU per hour.

## Heavy Duty Towing Tractor

A new field-tested heavy-duty towing tractor with a maximum draw bar pull of 7500 lb., is now available from the Clark Equipment Co., Battle Creek, Mich. Known as the Clarktor-75, the new towing tractor is equipped with an 82-hp Chrysler 6A engine with fluid coupling, planetary type



Clarktor-75, Towing Tractor



Bes-D-Frostr Heater

PETER KIEWIT SONS' CO.  
SELECTS THE...

# MADSEN

## MODEL 481 ASPHALT PLANT

**...to handle the strict mix specifications and speed required on today's highway and airbase jobs**



Here's what  
PETER KIEWIT SONS' CO.  
says about the new  
MADSEN Model 481 Asphalt plant  
"This new MADSEN Asphalt  
Plant gives us an excep-  
tionally fast charging time  
which results in a faster  
charge-mix-discharge cycle  
... and it has the ability to  
produce high tonnage day  
after day. The readily-  
stacked, box-like sections  
set up fast and are easy to  
move, thus saving valuable  
time between jobs."

you can make  
**MORE MONEY with MADSEN**

**LOOK AT THESE MADSEN FEATURES (and there are many more)  
THEY HELP TO MAKE THE MODEL 481 YOUR BEST BUY  
IN A 4000-lb., 5000-lb. or 6000-lb. ASPHALT PLANT**

The versatility of the MADSEN Model 481 Asphalt Plant means money in your pocket! It is designed basically as a 6000-lb. plant, yet you can purchase the Model 481 as a 4000-lb. plant and five years from now, as your needs are increased... you can convert your plant into a 5000-lb. or 6000-lb. asphalt plant by making only minor modifications. Thus, you can increase your plant's production capacity with very little additional cost.

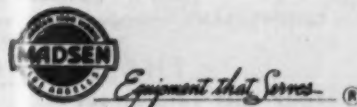


Photo above shows the MADSEN Model 481 Asphalt Plant in operation on a Navy project. Plant is in full operation, delivering top tonnage operating on a dry and wet mix cycle, with automatic weighing, and timing equipment controlling each batch.

- All air-operation of bin gates and mixer gate... reduces operator fatigue which means added tonnage. Air controls are faster, more accurate, thus decreasing time cycle from bin to truck.
- Oversize throughout with larger elevator, screen, bins, weigh-box, mixer and drives.
- Exclusive bin design (Patent Pending)... eliminates segregation.
- MADSEN Pressure Injection System (Patent No. 1987243)... the asphalt is pumped into the mill in 5 to 7 seconds!
- Portable design with built-in gooseneck, fifth wheel plate, king pin and rear axle mounting brackets.
- Generous use of adequate gear head motor units... fully enclosed anti-friction bearing gear box on mixer drive.

**GET THE COMPLETE STORY ON THE MADSEN 481 TODAY  
WRITE FOR YOUR COPY OF BULLETIN NO. 800**

**MADSEN IRON WORKS, INC.**  
14100 EAST ROSECRANS AVE., P.O. BOX 38, LA MIRADA, CALIF.





drive axle, four wheel brakes, complete tire interchangeability, one-piece hinged hood and full front fenders and running boards as standard equipment.

#### Pilot Bit for Post Hole Augers

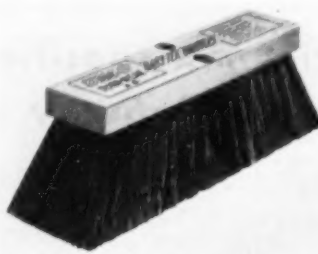
The Pengo, Jr. cone pilot, a cone shaped fishtail bit for use on all makes and sizes of post hole augers has been announced by Petersen Engineering Co., Santa Clara, Calif. It is claimed that the fishtail points prevent pivoting when rock is encountered, and the narrow fishtails will not "walk", but will penetrate hard surfaces such as hardpan. It has spiral positioned mold-boards to "screw" their way into the earth, and their forward shape makes them self-sharpening.



Pengo Jr. Pilot Bit

#### Street Broom Has Plastic Bristles

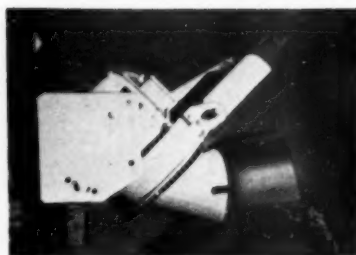
A new heavy duty street broom with a generous filling of thick tufts of new "Bass-Tex" plastic bristles, has been put on the market by Ox Fibre Brush Co., Frederick, Md. Called the Oxco "Dura-Wear," the broom is available in 14-in. and 16-in. sizes. The new Bass-Tex bristles, with a 4% in. trim, are stated to have proven in actual use tests that they will outwear ordinary street brooms by a considerable margin.



Oxco "Dura-Wear" Broom

#### Sand and Stone Piling Machine

A new sand and stone piling machine has been added to the line of Pettibone Mulliken Corporation, 4700 West Division St., Chicago 51, Ill. This beltless machine takes sand and stone discharge from belt conveyors and throws the material into piles



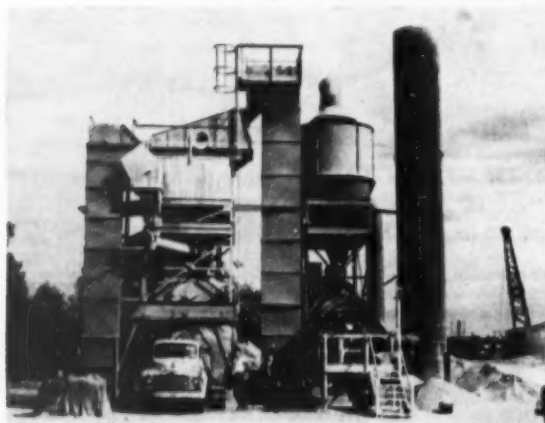
Model M Pettibone Speedpiler

or bins at a minimum rate of 40 tons per hour. When used in connection with a washing plant, the machine removes excess water from the material. Suspended under the discharged end of a conveyor, mounted on a platform or equipped with pneumatic tires on anti-friction bearing wheels, the new machine is stated to eliminate conveyor extensions usually required for comparable piling. Weighing only approximately 550 lb., it can be moved about quickly and easily. It is direct driven with a 3 hp motor.

#### Tractor-Drive Generator for Standby

A new generator, designed for belt-drive and producing regular highline type electricity, is offered by D. W. Onan & Sons, Inc., Minneapolis 14, Minn. With this generator, tractor owners can now provide their own low-cost emergency electric power when commercial power is off, or

## Contractors Say, "Less Down-Time... More Profitable Production with Sturdy, Efficient CUMMER ASPHALT PLANTS"



#### Famous Cumer Plants Declared Important Factor in Success of Nation-Wide Highway Construction Program

Wherever new highways are stretching out across the land... wherever existing roads and streets are being brought up-to-date, you'll find Cumer Asphalt Plants doing a great job and getting the job done.

Over the years (and that means almost sixty years right now!), reliable, capable contractors have learned to rely on Cumer Asphalt Plants like the one shown here. This complete plant belongs to The City of Des Moines, Iowa, and is a Cumer Portable Asphalt Plant with a capacity of from 55 to 60 tons per hour (based on 5% initial water content, dried to within 1/2 of 1% and heated to 350°-400°F.).

The City of Des Moines has found this Cumer Portable a high producer and dependable profit-maker. Contractors everywhere praise Cumer Plants for requiring only the barest maintenance. Their ruggedness accounts for "less down time", helps keep operators "in the black."

An economical, efficient Cumer Asphalt Plant *belongs* in your operation.

#### Some of the Fine Features Incorporated in Cumer Asphalt Plants

Mixing towers with vibrating screens and mixer.

Cold storage bin and feeder.

Diesel or electric power.

Dust collector discharging reclaimed dust into hot elevator.

Enclosed hot and cold elevators.

Dust elevator for filler.

Two furnace combustion with low pressure burner equipment.

CUMMER PLANTS—complete with all motor and starter switches—are available in sizes from 55 to 125 tons per hour.

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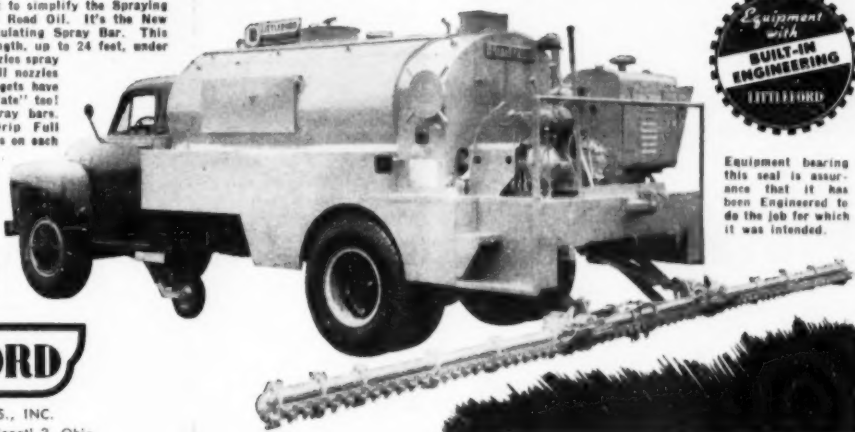
Cleveland 14, Ohio

# ANNOUNCING **NEW** the mechanically operated **LITE-WATE** full circulating, no-drip **SPRAY BAR**

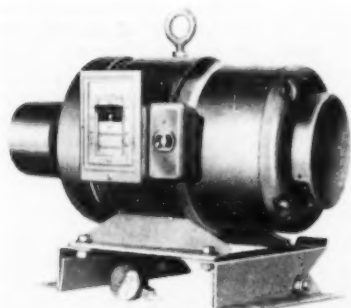


Again Littleford has Engineered a product to simplify the Spraying of Asphalt, Tar, Emulsion, Cut-Back and Road Oil. It's the New Mechanically Operated No-Drip Full Circulating Spray Bar. This new "Spray Bar" circulates the entire length, up to 24 feet, under pressure. By simply pulling a lever all nozzles spray in perfect unison, by pushing the lever all nozzles stop spraying instantly. No valves or gadgets have to be turned on or adjusted. It's "Lite-Wate" too! Weighs one third less than ordinary spray bars. Littleford's Mechanically Operated No-Drip Full Circulating Spray Bar has individual valves on each nozzle, allowing half the bar to spray or any number of nozzles to spray at one time. The Littleford "Spray-Master" with this New Mechanically Operated Spray Bar is the unit Contractors and Highway Departments have been waiting for. It's the last word in spraying efficiency.

This Littleford Mechanically Operated No-Drip Full Circulating Spray Bar has "Built-in Engineering" for Spraying Perfection.



Equipment bearing this seal is assurance that it has been Engineered to do the job for which it was intended.



Tractor-Drive Generator

voltage drops. Available in 3,000 4,000, 7,000 and 10,000-watt capacities, the new generators supply exactly the same 115/230 volt, 60-cycle alternating current delivered by the commercial power lines.

## New Dump Body of High Tensile Steel

Its first new model dump body constructed of high tensile steel has been announced by The Gallon Allsteel Body Co., Gallon, O. Known as the Gallon Model 12-3 contractors' body, it is 8 ft. long, 78 in. wide inside and 90 in. wide overall. Pyramid side braces and box type rear corner posts are standard features. Front and rear gussets are provided for sideboard installations. Body understruc-

ture is of closely spaced structural steel crossmembers which extend the full width of the body except for the tire clearance area. Crossmembers are welded to body



Model 12-3 Contractors' Dump Body

and to structural steel longitudinals with connecting braces to minimize warp and distortion of floor space. High tensile steel plate floor is submerged-arc, automatic seam welded.

## Special Alloy Grader Blade

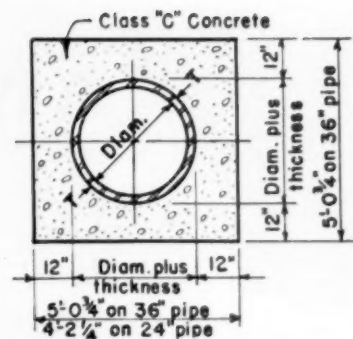
A new special alloy steel cutting edge, called the Rhinoblade because of its rugged construction, has been announced by The Shunk Manufacturing Co., Bucyrus, O., manufacturers of scraper, bulldozer, maintainer, snow plow and other blades. The blade is precision rolled to exact specifications. It is claimed it will greatly reduce downtime caused by the need for blade replacement.

## Truck-Mounted Shovel Has New Features

Many important new features for the new redesigned Model 120 TM-53 Hopto, have been announced by Badger Machine Co., Winona, Minn. The improved truck-mounted Hopto is completely hydraulic in operation, entirely eliminating cables, sheaves, chains and sprockets. The main frame of the unit is of formed plate which partially shields the operator and permits enclosure for adverse weather operation. Double-acting hydraulic cylinders actuate the gear of the "rack and gear mechanism" which replace the cables formerly used for swing. Relief valves cushion stops and starts on the 200° arc of the boom swing. The Model 120 TM-53 Hopto may be powered by water or air-cooled power units or driven by the power take-off of the truck. Greater digging depth of 11 ft. has also been built into the Model 120 TM-53. Fast cycling and a choice of bucket and back hoe widths from 8 to 38 in. give a wide variety of applications.



New Model Truck-Mounted Hopto



• Cross section of pipe encasement under the thruway fill.

• Encasing work in progress for relocated water mains for the City of Rochester. Concrete being placed in alternate sections using steel forms.

## Water Mains Carried Under Thruway

**A**N example of the special problems encountered in the design and construction of a modern expressway today, is the one of carrying the water mains for the city of Rochester under the New York State Thruway.

Three existing pressure mains had to be relocated at their junction point with the new Thruway line near the city. These mains included a 24-in. cast iron pipe laid in 1873-75, a 38-in. riveted steel pipe laid in 1893-94, and a 37-in. lock-bar steel pipe laid in 1914-18. These pipes represent the chief water supply for the city.

At the Thruway crossing the mains were relocated for a distance of about 1,000 ft. and passed under the Thruway at a point where the road lies in a 15 ft. cut. An offset relocation was necessary in order to pass around the grade separation for East Henrietta Road.

The relocated section was made with one 24-in. cast iron pipe and two 36-in. steel pipes. Pipes were encased in concrete with a minimum of 12 in. of cover on top, bottom and sides, the encasement extending beyond the outer ditches on the Thruway. The pipes rested on a 4-in. layer of sand in individual trenches immediately adjacent to the concreted sections.

The 36-in. steel pipe was supplied by Bethlehem Steel Company for \$56,390; the cast iron pipe, by U. S. Pipe & Foundry Company for \$15,650. Six valves and couplings cost an additional \$15,000.

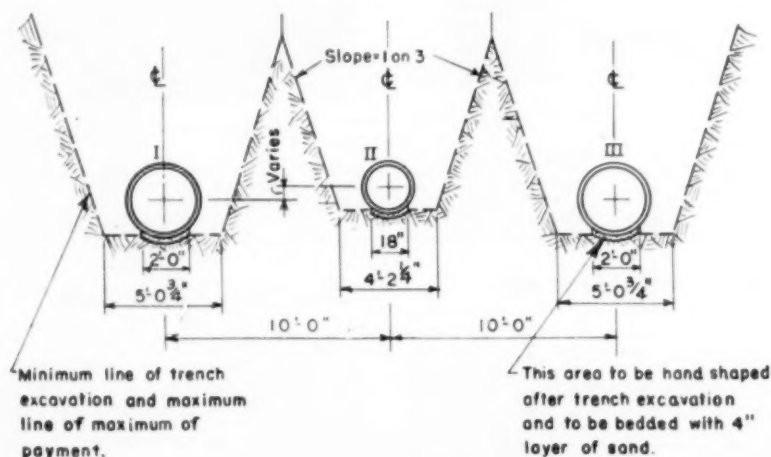
Installation was made by A. E. Petrossi, Inc., Rochester, New York, for a bid price of \$44,698, the New York State Thruway Authority paying for the relocation work and the City of Rochester purchasing the pipe and awarding contract for installation. Supervision was by the City of Rochester engineering staff and engineers from the New York State Department of Public Works.

• **A. V. Williamson** has retired from the U. S. Bureau of Public Roads at Denver, after 39 years of service with

the Federal government. He was district engineer of the Bureau of Colorado (1945-1950) and more recently division engineer at Ankara, Turkey.

### Blasting hardpan

A 2-ft. layer of hardpan which interfered with piledriving but did not warrant expensive drilling and blasting was broken up by a Canadian bridge crew by driving old boiler tubing and shooting with four sticks of 60 per cent dynamite loaded into each tube.



• How pipe lines were carried in trenches through the approaches to the thruway.



## Manufacturers' Literature

### Specifications on O-G New Shovel

Specifications No. 5326 on its new crawler-mounted 2-cu. yd. Model 920 shovel, dragline, clamshell, hoe and crane have been released by Osgood-General, P. O. Box 515, Marion, O. This 4-page specification includes all dimensions, lifting capacities and weights of the machine for its different classes of service. It also illustrates the demountable side frames of the crawlers, a feature provided for economy and ease of transporting machine from one location to another.

### Drainage and Construction Products

A 6-page, 2-color folder illustrating and describing how its complete line of drainage and construction products are used on the nation's express highways has been issued by Armo Drainage & Metal Products, Inc., Middletown, O. Illustrations of typical installations are shown and discussed briefly. Included are standard corrugated pipe; standard pipe-arch; asbestos-bonded pipe and pipe-arch; end sections; multi-plate structures; perforated pipe; pipe piling and pile shells; flex-beam guardrail; bin-type retaining walls, and steelox (steel-panelled) buildings.

### Bituminous Paver for Smaller Jobs

A 4-page bulletin on the new Admun Jr., Model 8, bituminous paver has been issued by Foote Construction Equipment Division of Blaw-Knox Co., Nunda, N. Y. Details of the paver are illustrated and described and specifications are included. The new machine is built to the same pattern of rugged construction and principles of quality found in the larger Admun black top paver, and is capable of large output with minimum maintenance.

### Diesel Engines and Electric Sets

An 8-page booklet (Form D383) issued by Caterpillar Tractor Co., Peoria 8, Ill., is complete with photographs of Caterpillar diesel engines and electric sets in actual on-the-job applications. It points out a few of the ways an owner may be robbed by poor functioning of his own equipment and how he may guard against it.

### Power-Take-Off Rotary Mower

A new bulletin, W-114, featuring its new Model 72 power-take-off rotary mower, has been published by Worthington Mower Co., Stroudsburg, Pa. The bulletin gives complete details and specifications of the new twin-blade rotary mower, which was designed for use on highways, parks, golf courses, private estates, parkways and institutions. One of the outstanding features of the "72" is the arrangement of the cutting blades. They are staggered so that the rotational paths overlap, for full, even, streakless mowing, eliminating the need for angle-towing the unit.

### How to Get More Work Out of Rope

Seventeen "life-saving" tips for improving wire rope service are given in a new folder entitled "How to Get More Work Out of Your Wire Rope," available from Leschen Wire Rope Division, H. K. Porter Co., Inc., 5909 Kennerly Ave., St. Louis 12, Mo. Suggestions for correct handling and storing, and recommendations for proper use of rope are included. Reading matter is brief but pertinent.

### Trench Hoes

Large illustrations, featuring all sizes of Lorain hoes, highlight a new 15-page picture booklet published by The Thew Shovel Co., Lorain, O. It covers the entire Lorain line, from the new  $\frac{3}{4}$ -yd. model NC-104 to the 2-yd. model 820, using job photos to graphically illustrate the "how and why" story of hoe application. Shown are the new, extra long booms and sticks adapted for extra deep digging, for the  $\frac{3}{4}$ -yd. Lorain TL-25's and the 1-yd. Lorain 50's.

### Tractor Service Manual

A new manual which illustrates approved methods for doing many of the service operations normally encountered in servicing and repairing International farm tractors is available from Owatonna Tool Co., 417 Cedar St., Owatonna, Minn. Instructions for removing and installing gears, bearings, pulleys, shafts, pre-combustion cups, cylinder sleeves, injection nozzles, etc., are contained in this manual. In addition, complete tool sets, both manually and hydraulically operated for special maintenance operations, are included.

### Pneumatic Tool Accessories

A 12-page folder (No. T-11-3P) illustrating and describing pneumatic tool accessories, such as moil points, clay spades, asphalt cutters, etc., carbide rock-drill bits and drill steel lines has been issued by Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. Specifications covering all tools included, plus application information.

### Mine Shaft Equipment Described

A new bulletin which pictures and describes mine shaft equipment produced by the Mayo Tunnel & Mine Equipment Co. is now off the press. Copies may be secured by writing to the company at 560 South Prince St., Lancaster, Penn.

### Off-Road Tires in Actual Service

A 24-page illustrated booklet showing a variety of off-the-road tires performing rugged service has just been released by The B. F. Goodrich Co., Akron, O. Every off-the-road tire in the BFG line is shown in actual service. The informative booklet is being distributed to major users of off-the-road equipment and shows typical logging operations, construction work, and strip mine and quarry operations.

## GRACE Asphalt and Compaction Equipment



3 sweeper models, axle, engine or tractor powered.



Chip spreaders 8' to 12' width. Also asphaltic concrete spreaders.



Rapid Fire circulating heaters heat and unload large tanks of asphalt.



Sheepsfoot Rollers 250 to 600 psi.



Rapidspray Maintenance Distributors. Also heaters for production melting of barreled asphalt.



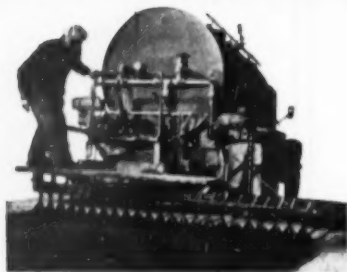
Pneumatic rollers 7 to 50 tons.

**W. E. GRACE MFG. CO.**

6007 S. Lamar

Dallas, Texas

# BITUMULS® leads in surface treatment work!



You will be interested in these facts obtained in our recent nation-wide survey:

- In the past five years most of the states in the union have *increased* the volume of sealing and surface treatment work done with asphalt emulsions.
- A majority of the counties in the country now *prefer* the use of emulsions to hot asphalt, tar and cutbacks for surface treatments.

BITUMULS LEADS ALL OTHER EMULSIONS for work of this type. As a pioneer product for Surface Treatments, Bitumuls continues as first choice of road-builders everywhere. It has won acceptance based on speed and ease of application, dependable performance, and long economical service. Bitumuls HV (high viscosity emulsion) holds more cover stone than any other binder. It sets-up faster, and provides a safe, non-skid surface.

Our new booklet, "BITUMULS SURFACE TREATMENTS AND PENETRATION PAVEMENTS," gives full details on all types of Surface Treatments, Single, Double and

Triple. There are Bitumuls Engineers working out of offices near you who will welcome an opportunity to discuss your Surface Treatment work.



200 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA

E. Providence 14, R. I. Perth Amboy, N. J. Baltimore 3, Md. Mobile, Ala.  
Columbus 15, Ohio Tucson, Ariz. Seattle, Wash. Baton Rouge 2, La.  
St. Louis 17, Mo. Inglewood, Calif. Oakland 1, Calif. Portland 7, Ore.  
Washington 5, D. C. San Juan 23, P. R.

**From Maine to Montana . . . STATE, COUNTY and TOWNSHIP  
CONTRACTORS, ENGINEERS  
and SUPERINTENDENTS USE**



**Nothing else like it for Uniform  
Spreads even on Steep Grades**

**FOR CHIPPING  
• SEAL COATING • SAND  
• PEA GRAVEL • AGGREGATES**

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**SINCE 1929**

**IN STREATOR, ILLINOIS**

# FLINK

*one-man "Even-Seal"*

## SPREADERS

*to Speed Up Jobs  
and Cut Costs*



### New Double-Drum Power Control Unit

New literature is available from Pacific Car and Foundry Co., Renton, Wash., on their new Carco double-drum power control unit. This heavy duty unit, with double swivel fairleads, is available for all makes and sizes of tractors. Further information on specifications and performance characteristics may be obtained by writing for Bulletin L-203. Specify make and size of tractor. Write Pacific Car and Foundry Co., Catalog Dept., 4th and Factory Sts., Renton, Wash.

### Light-Weight Pipe

As a practical help to pipe users, Naylor Pipe Co., 1230 East 92nd St., Chicago 19, Ill., has issued a new bulletin No. 507 showing typical applications of its light-weight lockseam—spiralweld pipe and fittings. Included are standard specifications on pipe from 4 in. to 30 in. in diameter, together with data on fabricated fittings, flanges, and connections to meet all pipe line requirements.

### Spreader for Ice Control

Such improved features as the Fifth Wheel friction drive, the auxiliary distributor power (both designed for a more positive spread control), and the split-bottom dump (for year 'round usefulness) are only a few of the design features described in detail in the new Baughman "SC" Ice-Control Spreader Bulletin. No. A-380, released by Baughman Mfg. Co., Jerseyville, Ill.

### Hard-facing Electrodes and Other Applications

A new 12-page catalog (Bulletin AR53-20) on its lines of Wear-Arc hard-facing electrodes and Wear-Flame hard-facing rods, offered in nine and four basic types, respectively, has been issued by Alloy Rods Co., York, Penn. Catalog copy is written from the "how to do it" standpoint, and three pages are devoted to an "Application Guide" citing wear parts, types of wear, and the correct electrode or rod to use in 13 major industrial applications, on about 75 common types of hard-facing problems.

### Line of Concrete Sawing Equipment

Its complete line of concrete sawing equipment is illustrated and described in a new 4-page bulletin of Concrete Sawing Equipment, Inc., 331 N. Santa Anita Ave., Arcadia, Calif. Illustrations, descriptions and specifications are given for the self-propelled Concut concrete saw, the standard saw, lightweight saw, the Joint Master and Concut blue blades.

### Athey HiLoader Applications

A colorful new catalog on the versatile Athey Force-Feed HiLoader is now available from Athey Products Corporation, 5631 West 65th St., Chicago 38, Ill. The well illustrated 8-page booklet shows the HiLoader on a variety of applications and details the many features that give high production. Actual job data are presented to prove HiLoader performance.

### Hardfacing Alloys Catalog

Amsco's complete line of hardfacing and build-up rods and electrodes are fully described in a new 48-page, 2-color catalog published by American Manganese Steel Division, 389 E. 14th St., Chicago Heights, Ill. Typical applications are shown in over 70 photographs and full metallurgical and physical properties are included for the four automatic and fifteen manual rods and electrodes. There is also a complete technical section with charts and photographs which will help select the correct hardfacing rod for those unusual or hard-to-solve wear problems.

### Complete Range of Carset Jackbits Shown

A new bulletin (Form 4146) issued by Ingersoll-Rand Co., 11 Broadway, New York 4, shows the complete range of Carset Jackbits for use with most of the popular threaded connections in use today. The bulletin gives the user a selection guide for choosing the right Carset Bit for each connection and application.

### Metal Lath Centering for Concrete Slabs

Metal lath centering to provide a rigid form and reinforcing for short span concrete slabs over steel joists is the subject of a technical bulletin, released by Metal Lath Manufacturers Association, Engineers Building, Cleveland 14, O. Types of metal lath used in centering, details and sample specifications for installation, spans and safe loads for  $\frac{3}{8}$  in. and  $\frac{1}{2}$  in. rib lath and sheet lath are given.



## Selecting Proper Wire Rope for Various Jobs

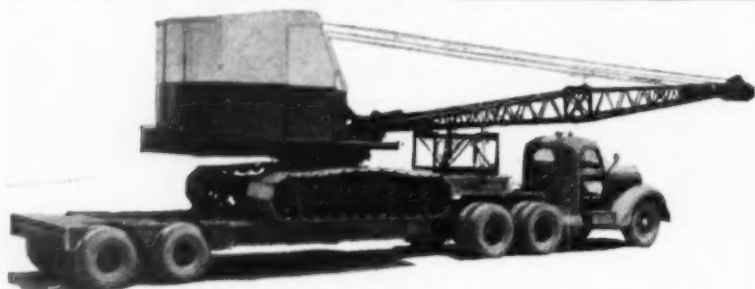
"What's the Difference in Wire Rope?" a new brochure available from Leschen, answers questions which may be in the minds of wire rope buyers. It explains differences in the selection of wire going into various rope, and differences in manufacturing processes. It also itemizes differ-

ences in results. This informative brochure may be obtained by writing Leschen Wire Rope Division, H. K. Porter Co., Inc., St. Louis 12, Mo.

## Tautline Cableways

A new 3-color catalog, available from Sauerman Bros., Inc., Dept. R-18, 522 S. Clinton St., Chicago 7, Ill., contains 16

pages of photographs, sketches and text describing types, spans, working loads and other details of tautline cableways. The catalog illustrates cableway applications that will be of interest to construction and consulting engineers, public utilities and industrial concerns.



## YOU CAN DEPEND ON TRANSPORT TRAILERS

CARGO CARRIER MODEL GPX-F Especially designed for safe, secure hauling of heavy cantilever loads. Capacities 16 through 35 tons. Exclusive TRANSPORT tandem axle assembly gives full oscillation of each axle over rough roads . . . adds extra mileage to trailer tires . . . reduces road shock transfer to payload. TRANSPORT semi-trailers fit single or tandem axle truck tractors. Flat deck as shown or drop deck.

**FOR ADDED SERVICE** . . . Single or dual axle TRANSPORT front dollies convert to full trailers easily and quickly.

WRITE FOR  
COMPLETE  
INFORMATION



## NOW! "TARPS" AT DEALER COST!

### BURCH Weather-Tite TARPAULINS

Now for the first time you can get the QUALITY BURCH WEATHER-TITE TARPAULINS in all weights, at a new low price. You are invited to write in for our new price list. . . Simply submit your request on your letterhead and you will be eligible for our dealer price list. Compare the quality—Compare the workmanship—COMPARE THE PRICE and you will specify BURCH WEATHER-TITE!

### BURCH MANUFACTURING COMPANY, INC.

FORT DODGE, IOWA

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Do your sealcoating  
and ice control jobs  
the fast easy Swenson way.  
Spreads salt, chloride, sand,  
rock chips, gravel or cinders any  
width or amount desired.

Free Information

**Swenson Spreader & Mfg. Co.**

Lindenwood, Illinois



## How to Use Seaco Welding Electrodes

Tips on using Seaco AC/DC hard surfacing welding electrodes to get the most out of maintenance are outlined in the Manganal Marketer (Vol. 2, No. 10) available from the Stulz-Siekles Co., 134-142 Lafayette St., Newark, N. J. Seaco hard surfacing electrodes are stated to prolong the life of manganese-steel parts and Manganal build-ups by forming a protective armor, which takes the brunt of the initial impact and abrasion, allowing the rebuilt or repaired parts to work-hardened before the wearing process starts. Carbon or other alloy steels can be coated with Seaco hard surfacing for longer life. Seaco hard surfacing electrodes will not become softened by picking up alloys from the parent metal.

## Portable Gravel Plant

A new 8-page, 2-color bulletin (647) published by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn., describing its new 35-S "In-Line" portable gravel plant, is complete with specifications and details. The In-Line feature of the 35-S (which means that the basic flow of material is in line, longitudinally, with the axis of the plant, the material being fed into the rear and discharged at the front end) is clearly explained in the booklet by use of a diagram tracing the flow of material through the plant.

## Land Clearing and Logging Manual

A new logging, rigging and land clearing tackle manual has been announced by Hyster Co., 2902 N.E. Clackamas St., Portland 9, Ore. The booklet illustrates various kinds of gear and tackle used in these operations with drawings and specifications of recommended rigging procedures.

## Small Tractor Has Many Uses

An 8-page catalog on the Agricat is available from Earl H. Pence & Co., Inc., 2150 Washington Ave., San Leandro, Calif. This tractor can be equipped with a bucket, rotary broom, dozer blade, scarifier, spring tooth harrow and other tools. The catalog shows illustrations of the Agricat in many construction and maintenance operations. Drawings give dimensions of the tractor. The tractor weighs 1160 lbs., is 38 in. wide, 58 in. long overall, and 41 in. high.

## Sump Pumps

A new bulletin (1029) issued by Johnston Pump Co., 3272 East Foothill Blvd., Pasadena 19, Calif., contains construction details, head and capacity tables, dimensions and other data on Johnston unit-line sump pumps. These pumps form a pre-engineered packaged line from which a pump can be selected for existing conditions or for new construction.

### "New Tools for Loggers"

A new informative 8-page folder (Form G-1163-1053) designed to help logging men keep production costs in line is available from Advertising Department, LeTourneau-Westinghouse Co., Peoria, Ill. Called "New Tools for Loggers," it describes and illustrates machines specifically designed to give the logger high speed with rugged power—two models of the Tournarch, and the Tournaskidder.

### Aircospot Welding Process

A new 4-page folder has just been produced by Air Reduction Sales Co., 69 East 42nd St., New York 17, N. Y., covering in detail the features of the new Aircospot process and equipment. This inert gas-shielded spot welding gun which welds from one side only and without the need for back-up plates, is completely described with illustrations, physical and electrical specifications and operating data.

### 1/2-cu. yd. Shovel; 15-Ton Crane

A new 8-page, 2-color catalog describing its improved 15-ton lift capacity, 1/2-cu. yd. dipper capacity 205 excavator has been released by Koehring Co., 3026 W. Concordia Ave. Well illustrated with 25 photos and diagrams and featuring brief, concise text matter, the catalog describes heavy-duty operating features of the 205 when equipped as a shovel, hoe, crane, or dragline. The unit is available either crawler-mounted or on a truck body.

### Street Flushers

A full line of street flushing and cleaning equipment is featured in a new 6-page bulletin (54-2) issued by Rosco Manufacturing Co., 3118 Snelling Ave., Minneapolis, Minn. The bulletin contains numerous photos illustrating a wide selection of the manufacturer's various capacity Model MTA street flushers now in use. To complete its presentation of street flushing and cleaning equipment, the bulletin features photos and description of several other smaller pieces of equipment.

### 50,000 lb. Cement Tester

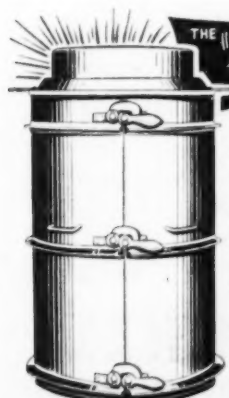
A new 50,000-lb. cement tester is presented in Bulletin 4205, issued by Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa. Its four illustrated pages cover the evolution of the new machine with development of ASTM Test Method C 109-52, and give features and specifications of the machine.

### Machine Tool Attachments

The complete story on their many machine tool attachments and accessories has been collected into one large bulletin by South Bend Lathe Works, South Bend 22, Ind. The bulletin, "165 Reasons Why," contains 160 illustrations, and offers a bird's-eye view of the job range now possible with their lathes, drill presses and shapers.

### Highway Guard Rail Fittings

A 4-page catalog is available from Malleable Iron Fittings Co., Branford, Conn., on its line of fittings for highway guard rail. Drawings show 14 types of end anchorages. Brief descriptive matter is included. Splices, cable offsets, cable supports, hook bolts and anchor plates also are pictured and brief descriptions given.



### THE "Quinn Standard" FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 40 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

#### QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufacturers QUINN CONCRETE PIPE MACHINES

**QUINN WIRE & IRON WORKS 1637 - 12<sup>th</sup> St. Boone, Iowa**



NO "CRYSTAL BALL" NEEDED

### Detectron "505" PIPE DETECTOR

takes all guesswork out of Pipe Detection



- DETECTS, TRACES and CENTERS PIPE, CABLE, ETC.
- ESTIMATES EXACT DEPTH
- SEPARATES PARALLEL PIPE, CABLE and CONDUIT

A crystal ball might be one way to locate buried pipe or cable at an excavation site. But... a *better, safer and more efficient* way is to use the new, improved Detectron "505" that accurately pinpoints the exact length, depth and location. *Stop guessing—and be sure!*

Send today for FREE Catalog No. 58

THE **Detectron** CORPORATION  
5420 VINELAND AVE., NO. HOLLYWOOD, CALIF.

## RUEMELIN BLAST GENERATORS

FOR CLEANING BRIDGES—  
WATER TOWERS—STRUCTURAL STEEL



Many contractors use Ruemelin Blast Generators for cleaning steel work to remove rust, paint and scale before repainting. These machines are also used to remove laitance from cement wherever concrete construction is in progress. A wet adapting nozzle can be furnished to convert dry machines to wet type of operation. Built in several sizes.

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Bulletin 36-C

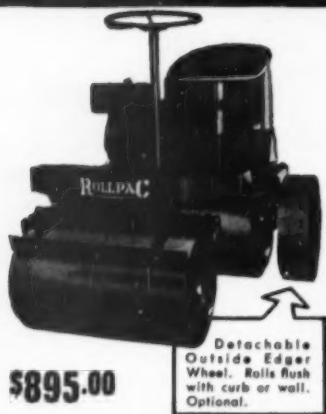
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DUST COLLECTING  
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## SOIL AIRE ROLLPAC

Ruggedly built for heavy-duty service



**\$895.00**

Detachable  
Outside Edger  
Wheel. Rolls flush  
with curb or wall.  
Optional.

A Standout Popular-Priced  
One Ton Roller. Send for  
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## SOILAIRE INDUSTRIES

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Sold by over 75 distributors in United States and Canada

Power in  
a handy  
"package!"



Easy to move because it's balanced. Doors of this portable Electric Plant open for operation. Entire weatherproof housing is quickly removable for servicing. Gas tank is underneath for extra safety. Dependable "U.S." unit is D.C. for battery charging or operating portable tools. Available also in A.C. "U.S." builds the world's most complete line. Write for information, briefly stating your requirements.

UNITED STATES  
MOTORS CORP.  
420 Milwaukee St.  
Babcock, Wis.



## With the Manufacturers and Distributors

**Field Personnel Changes by Detroit Diesel.** Several changes in the field sales and service organization of the Detroit Diesel Engine Division of General Motors have been announced by E. F. Bentley, general sales manager of the division. Bart W. Patrick, formerly sales representative in the division's northwest zone which includes the states of Oregon and Washington has been moved to the New England zone in the same capacity. Leslie Southgate, formerly sales representative in New England will assume a new assignment in the industrial sales department in Detroit. J. T. Hanna, former service representative in Oregon and Washington become sales representative in the same zone and Harold J. Vaughn is moved from the service training department in Detroit to the post vacated by Mr. Hanna.

**Goodman Acquires Diamond Crusher Line.** The Goodman Manufacturing Co., Chicago, pioneer builder of mining and tunneling machinery, has acquired from Diamond Iron Works, Minneapolis, its line of crushing, screening and handling equipment for rock, sand and gravel. Operating as Diamond Iron Works, Division Goodman Manufacturing Co., manufacture will be transferred to the Goodman main plant located at 4834 South Halsted St., Chicago, Ill. Key personnel of Diamond concerned directly with sales, engineering and service will be retained under the direction of Carl E. Hanson, sales manager, and W. Eckley, chief engineer, who will make Chicago their headquarters.

**Doug-Lynn Moves to Oakland.** The Doug-Lynn Manufacturing Co., previously known as the Doug-Lynn Co., manufacturers of the True-Lay paving machine, have moved their offices to 339 Fifteenth St., Oakland 12, Calif. They added the word "manufacturing" to the name of the company to make it more descriptive of their operation as manufacturers. The firm plans to produce several new items during the year, selling entirely through established distributors in the construction field.

**Buzzard Appointed Sales Manager.** Ralph M. Buzzard, heretofore motor truck sales manager of the northwest region, has been appointed manager of the motor truck sales department of International Harvester Co., Chicago, Ill. He succeeds W. K. Perkins, who will become staff assistant to the vice president working on special assignments. Mr. Perkins has been away from active duty for some time because of ill health.

**Gallon Allsteel Body Acquires Austin Tractor Loaders.** Gallon Allsteel Body Co., Gallon, O., has acquired the sales and manufacturing rights to the complete line of Austin overshot tractor loaders patented and built by John Austin Manufacturing Co., Denver, Colo. All Austin activities will be moved to Gallon Allsteel plants in Gallon and Mansfield, O. John R. Austin and his engineering staff will serve Gallon as consultants and advisors.

**Takes Over Byers Machine Co.** A new corporation, the Byers Manufacturing Co., Ravenna, O., has taken over the business of The Byers Machine Co., Ravenna, O. This has entailed no change in management or policy, and is solely a transfer of assets to the new corporation. The Byers Manufacturing Co. will continue to build the same fine line of machinery that has been built in the past, and the activities of the new company will be increased and extended.

**Marschalk Transferred to Chicago.** R. J. (Ray) Marschalk, heretofore district manager in the San Francisco office of Homelite Corporation, Port Chester, N. Y., has been appointed Chicago district sales manager, with headquarters at 2409 Lake Street, Melrose Park, Ill. R. S. (Bob) Kennedy has been appointed manager of Homelite's Melrose Park branch office.

**Le Tourneau-Westinghouse Appointments.** W. E. Hendricks, assistant to general salesmanager Le Tourneau-Westinghouse Co., Peoria, Ill., since last June, has been named domestic sales manager of the company. Lloyd Roger, assistant advertising manager for the past four years, has been appointed sales promotion manager.

**Campbell Appointed District Representative.** C. F. (Pete) Campbell has been appointed east central district representative for Gorman-Rupp Co., Mansfield, O. He has been associated with the company in sales, advertising and production assignments since 1946.

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SINCE 1893, KNOWN FOR

## Quality

PNEUMATIC TOOLS and  
CONTRACTORS' SUPPLIES

Write  
for Our  
Catalog

# BICKNELL

MANUFACTURING CO.  
ROCKLAND, MAINE



# **EUCLID 15.5 YARD SCRAPER**

**LESS THAN  
1000 HOURS  
WILL SACRIFICE FOR  
IMMEDIATE SALE**

*Subject to Prior Sale*

**Ph. L. D. UPTOWN 3-2005  
Milwaukee, Wisconsin**

## **SURPLUS INVENTORY**

The George Bozich Estate, operators of the Monon Crushed Stone Co., wish to dispose of the following surplus inventory not needed in their operation:

- 2 KRI International Trucks equipped with rear dump rock bodies
- 2 1945 WA20 White Trucks equipped with rock bodies.
- 1 Link-Belt Steam Rail Crane, 50 ft. lattice boom, capacity 15 tons at 15 ft.
- 1 Osgood Drag-line equipped with 1 1/2 cu. yd. drag-line bucket.
- 1 Bucyrus Erie Electric Shovel, model 50B, 2 cu. yd. capacity rock bucket.
- 1 Brown Hoist Shovel with clam crane attachments.
- 1 Allis Chalmers Roller Crusher, 16" x 42" complete with V-Belt drives and belts.
- 1 Allis Chalmers Roller Crusher, 14" x 30" complete with smooth face drive pulleys.
- 1 2 cu. yd. Keeler Clam Shell Bucket.
- 1 Allis Chalmers Mill with 26" wide feed complete with V-Belt drives.
- 1 No. 5 Jumbo Jr. Williams Hammer Mill complete with drives and 1,000 new extra hammers.
- 1 Street Bros. Mine Hoist equipped with drive drum, 5 ft. diameter to be powered by 100 H.P. electric motor or its equivalent.

**Nicholas & George Bozich, Jr.**  
Box 146  
Company Administrators  
Monon, Indiana — Telephone Monon 4101

# **FOR SALE AT REDUCED PRICE**

**Reason: Operation suspended**

- 1 - 7W Monighan
- 1 - 1600 P&H 6 yard
- The following to be sold as one lot:
- 3 - E-50 Tournarockers
- 2 - Extra tiers
- 1 - Air wrench
- 1 - 6000 gallon Propane Tank with the necessary pumps

**WRITE OR PHONE 3105 POTTSVILLE**

**FRANK COLITZ  
POTTSVILLE, PENNSYLVANIA**

## **1946 TD-14 INTERNATIONAL TRACTOR**

With Bucyrus-Erie Dozer Blade.  
GOVT. SURPLUS - \$4,950.00  
**S. Cohn & Son Auto Co.**  
142 W. Vermont St. - Plaza 5544  
Indianapolis, Indiana

# **CRANES**

1—2 cubic yard Lima Combination Crane and Shovel with 100 foot boom plus 25 foot jib.

1—1 1/2 cubic yard Northwest Crane.

*Subject to prior sale*

**FRAZIER - DAVIS CONSTRUCTION CO.**  
1319 Macklind Avenue, St. Louis, Mo.  
Sterling 1950  
Box 188      Grahamsville, New York  
Grahamsville 2861

# **BARGAIN SALE**

12—3/4 yard dragline buckets F.O.B. our yard \$399.00 each.

12—1 1/2 yard dragline buckets F.O.B. our yard \$560.00 each.

These buckets are new and the price is no reflection on manufacturer. Must move at once.

**Armstrong Equipment Co.**  
4601 First Avenue North  
Birmingham      Alabama  
Tel. 9-2134

# **NOW! Get Circulation Where It Counts . . . Roads and Streets' Clearing House REACHES THE MARKET'S HEART**

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CITY, COUNTY ENGINEERS  
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36 in.	8.10
48 in.	7.65
60 in.	7.20
72 in.	6.75
84 in.	6.30
96 in.	5.85
108 in.	5.40
120 in.	4.95
132 in.	4.50
144 in.	4.05
156 in.	3.60
168 in.	3.15
180 in.	2.70

**COPY AND CLOSING DATES**  
Final closing date is the Fifteenth of the preceding month. Magazine is issued 1st of publication month. If proof desired, copy must be received 5 days preceding closing date.

## **CLEARING HOUSE SECTION ROADS AND STREETS**

**22 W. MAPLE STREET, CHICAGO 10, ILL.**

Please insert the Attached Advertising Copy in the Next Issue of **ROADS AND STREETS** to Occupy \_\_\_\_\_ Inches of Space.

Number of Insertions \_\_\_\_\_

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

**TELL US WHAT YOU HAVE TO OFFER AND WE'LL SET UP THE AD FOR YOU.**

### SPECIAL OFFERING CRANES

**BROWNING WAGON CRANE** 3 axle carrier, 14 ton rated capacity, 40' boom, gasoline engine, also has engine generator set. An old machine, but in very good mechanical condition. Priced low.

**ALLIS-CHALMERS TRACTOR MODEL HD20 SERIAL #3188**—1951 approximately 2,500 hours, equipped with a Baker engine mounted hydraulic bulldozer and Carco Model "J" single drum winch, steel cab with safety glass windshield.

### BUCKETS

- 1—Dragline 4 Yd. Page.
- 1—Dragline 1 Yd. Basket Type, Medium Duty.
- 1—Dragline 2 Yd. with Teeth.
- 1—Dragline 2½ Yd. Omaha with Chains & 2 Pieces Reversible Teeth.
- 1—Dragline, 2¾ Yd. Hendrix.
- 1—Concrete Laydown, 2 Cu. Yd.
- 1—Concrete Laydown, #438 Gar-Bro.
- 1—Concrete Laydown, 2 Cu. Yd. #694.
- 1—Concrete Laydown 1 Cu. Yd. for R.M. Concrete.
- 1—Concrete Low Slump, #R-125-X Blaw-Knox, 4 Cu. Yd.
- 1—Concrete Laydown, 1 Yd. Insley.

Davey 160 Cu. Ft. with Hercules Gasoline Engine, 2 pneumatic tired wheels.

Phone, Wire or Write for Complete List

### COOKE TRACTOR CO.

2120 S. Seventh St., St. Louis 4, Missouri  
Sidney 1070

REPRESENTING

### GRANITE CITY STEEL CO.

Sale of Machinery and Supplies from  
Plant Expansion Project

## READY MIX TRUCK

3—1948, 4½ Ransome mixer, mounted on a 1948 Ford F-8, Thornton Tandem. 10/20 tires, mixer, truck and tires are in excellent condition.

PRICE \$6000

2—1953 5 yard Challenge Mixers. 1—Mounted on 1952 F8 Tandem. The other mounted on 1949 G.M.C. Tandem. Both for \$14,000.

Subject to Prior Sale.

### CENTRAL STATES SUPPLY & EQUIPMENT CO., INC.

313 South Midler Syracuse, New York  
Phone 3-7268 (24 hours)

### FOR SALE

### Ready-Mixed Concrete Plant

— Consisting of —

- 1—40' Barber Greene 18" Belt under-track aggregate conveyor.
- 1—136' Barber Greene 18" Belt Conveyor to aggregate Bin.
- 1—3-compartment 160 ton aggregate bin.
- 1—2½ cubic yard weigh batcher.
- 1—600 barrel bulk cement bin.
- 1—Under-track cement screw.
- 1—45' bucket elevator cement to bin.
- 1—30' cement screw from bin to batcher.
- 6—2½ to 4 cubic yard transit mixers mounted Ford F-8 trucks.

This equipment located in Barnwell, S. C. It has been used approximately 18 months. All in A-1 condition and priced to sell.

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**W. R. CARSON**

35993 - Columbia, S. C.

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# DW21

S/N 8W182

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Only 652 hours. Just made completely current with factory modifications. Guaranteed A-1 in every way. Inspect this one at our yard. Excellent buy at

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**MacAllister Mach. Co., Inc.**

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Available Immediately

### Sale or Rent:

Manitowoc, Model 4500—6 yards  
Northwest, Model 95—2½ yards  
Bucyrus Erie, Model 348—yards  
Lima, Model 802—2 yards  
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Lorain, Model L-41—¾ yard  
all with Diesel Engines

Dragline buckets furnished on the above

- 3—LeRel Air Compressors, Model 600 C.F.M.; steel wheels; Murphy diesel engine
- 5—Cietrac Tractors; equipped with Toppers, Trigger Hoist; Drills and Swamp pads.
- 2—D8 Tractor Dozers
- 1—LeTourneau—12 Yard Pan
- 2—D4—Hydraulic Dozers
- 4 Sets Athey Tracks
- Cat. 12 Grader with Welder; Little Plant Trucks and Jeeps

Priced to sell—Call or Write:

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Clewiston Tel.—2-5121 or 2-5101 Florida  
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## HEAVY DUTY VALUES

1 NORTHWEST 80-D Murphy Diesel, 1948, perfect shape. \$19,000.

13 MACK TRUCKS, Model SCSW, 30-ton Tandem, 1947 and 1948. 3 to 4 new tires each unit. Also \$20,000 new parts. Any reasonable offer.

4 EUCLIDS, 22-ton, 1949 and 1950. Any reasonable offer.

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HIBBING, MINNESOTA

### FOR SALE AIR HOISTS

- 5 - Used one Ton Detroit, type P, single strand, hook suspension type, 2000 lb. cap., 20 to 25' per min. hoisting speed, full load with 80 to 100 lb. air pressure, height of lift 12'.

Price: \$325.00 each

- 3 - Used two Ton Detroit, type P, with hand chain propelled I-beam Monorail trolley, 4000 lb. cap. 12 to 14' per minute hoisting speed, full load, with 80 to 100 lb. air pressure, 10' height of lift.

Price: \$325.00 each

- 1 - Used one ton Chicago, single strand, hook suspension type.

Price: \$225.00

All above hoists are in operating condition.

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400 - Warren No. 43-A New A.E.R.A., Wt. 28 lbs., Length 60", size of spike 9/16" or 5/8", \$6.00 in lots of 1 ds.

### NEW HOISTING ENGINES

Ideal for brick elevators, steel erection, Marine Railway, etc.

### AT A TREMENDOUS SAVING

- 8 - Portable, single drum, gas driven with friction brakes and clutch, automatic cable guide; with 7½ HP Wisconsin air wound engines.

Price: \$500.00 each

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Hyster D7 N. Towing Winch	\$1,100.00
Caterpillar 12 motor grader 9K	1,750.00
Caterpillar D7 Streamline Dozer	3,750.00
Caterpillar R4 tractor, good	750.00
Caterpillar 50 sideboom	1,500.00
International UD24 power unit	1,500.00
LeTourneau M. Scraper, perfect	1,750.00
La Plante Choate C106 Scraper	1,750.00
Galion 5-8 ton tandem roller	1,750.00
Galion 8-12 ton tandem roller	1,875.00
12-9.00 x 24-10 ply road grader tires, new factory seconds. Each	57.50

### AL FISHEL

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Phone: Lucas 4482

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We have a complete selection of good used No. 212's, No. 112's, both single and tandem drive models, and No. 12's. Priced from \$2500.00 up.

Call, wire or write for detailed descriptions and prices.

### Gibbs-Cook Equipment Co.

325 No. Jackson, Mason City, Iowa  
Phone 243

# FOR SALE AT A SACRIFICE BRAND NEW

STANDARD STEEL Asphalt Paving Plant, Series SEM 4000 lb. Semi-Portable (100-125 Ton per hour) Using combination Diesel Engine, Electric Gearmotor and Motor Drives. Including cold elevator with 16" x 8" buckets; 72" x 30' sand dryer with burner and drive excluding power unit; base structure; mix and weigh section; stairway, platform and ladder; 40 ton storage bin with gates, overflow pipes, reject chute; 48" x 12' horizontal vibrating screen with 4-way separation and drive; steam jacketed mixer with drive excluding power unit; mixer dust housing; weigh hopper with scale system; steam jacketed asphalt bucket with scale system; hot elevator with 16" x 8" buckets and 20 hp gearmotor; 4-ton auxiliary overflow bin; dust collecting system including 10' diameter cyclone, piping, fan; dust elevator with gearmotor; dust bin and screw with motor; timer with mixer, weigh box interlock and batch counter; fuel oil pump set; recording pyrometer; UD-24 diesel engine for mixer drive, including one 40KW generator and 2 UD-14 diesel engines for dryer and fan drive.

Condition: Completely new. Never erected or operated.

Price: Reasonable.

**BOX 1130, ROADS & STREETS**

**22 W. MAPLE ST.**

**CHICAGO 12, ILL.**

## FOR SALE

5—LeTourneau C Roasters, 2 years old, with 15 yd. scrapers. New rubber on drive wheels. Excellent condition. Priced right. \$15,000.00 each.

**Michigan Tractor & Machinery Co.**  
Detroit, Michigan  
VE 7-5000

## FOR SALE

2—Koehring 301 Shovel Fronts ..... Ea. \$800.00  
1—Trench Hoe Attachment for B-E 10-B 800.00  
1—Link-Belt Speeder LS-50 complete with trench hoe, 40 foot crane, and fairleads. Buda gas engine.  
1—Unit Model 614 Trench Hoe with Buda gas engine.

All Above Equipment in Excellent Condition.

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Serial #4324, digs 24" x 5 1/2 ft. deep, special long conveyor, excellent condition, located in New York City \$3750.00.

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- 5 Allis-Chalmers HD5G Tractors with front-end-loader ..... \$4250.00-\$6500.00
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- 1 Allis-Chalmers HD10W, Serial No. 8228 w/Baker Hydr. Bulldozer ..... \$5500.00
- 1 Allis-Chalmers HD14C, Serial No. 6201C w/Baker Cable Dozer and Single Drum Control Unit ..... \$5500.00
- 1 Allis-Chalmers HD14C, Serial No. 6001C w/Baker Cable Dozer & Single Drum Control Unit ..... \$7500.00
- 1 P&H Half Yard Front Shovel ..... \$3500.00
- 1 International Model H3 Wheel Tractor w/Wagner front-end Loader ..... \$1650.00
- 1 Allis-Chalmers AD3 Motor Grader, Serial No. AD3-1F332 w/Scarifier, Cab, Heater, etc. .... \$6000.00
- 1 Galion Model 101 Motor Grader, Serial No. M-5389 w/Scarifier, Cab, Heater, etc. .... \$3750.00
- 1 Huber Model M-150 Maintainer w/Hercules Gas Engine ..... \$1000.00
- 1 Shield Bantam Truck Mounted Transit Crane used only 150 hours ..... \$ 600.00
- 1 10-Ton Semi-Trailer w/Mechanical Brakes ..... \$ 600.00
- 1 Allis-Chalmers BD2 Motor Grader w/Scarifier, etc. .... \$6000.00

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FOR SALEat Trenton Dam,  
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Shovels, Draglines, Cranes  
Tractors & Scrapers  
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Concrete Batching Plant  
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Trucks & Pick-ups  
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Re-conditioned—Priced low  
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USED EQUIPMENT  
First Class Condition

- 1 ea. Worthington 105 CFM, Portable Air Compressor ..... \$1,800.00
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- 1 ea. Worthington 160 CFM, Portable Air Compressor ..... 2,600.00
- 1 ea. WJ-55 Ingersoll-Rand Rock Drill ..... 75.00
- 1 ea. WJ-45 Worthington Rock Drill ..... 225.00
- 1 ea. WB-50 Worthington Paving Breaker ..... 150.00
- 1 ea. 6WD 32 General Electric 200 amp. Portable Arc Welder, W/ cables and Holders ..... 375.00

## NEW EQUIPMENT

- 1 ea. W-14 Worthington Clay Spade with spade ..... 142.50

## REBUILT DIESEL EQUIPMENT

- 1 ea. Model 6DC844 Buda Industrial Power Unit with gasoline starting engine, 163 HP, at 1400 RPM, New Engine guarantee ..... 3,000.00
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## For Sale Cleveland Trencher

1953 Model 110. Fully equipped for farm tilling; 16 inch treads, bucket cleaner, etc. Sacrifice.

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## FOR SALE

- 1 Used No. 880 Senior Universal crushing and screening plant, 10x36 R. B. jaw crusher, 30x18 R. B. roll crusher, powered by D13000 Caterpillar Diesel.
- 1 Used Cedarapids 3030 Impeller Breaker mounted on trucks, less power.
- 1 Used Lippmann 10x16 R.B. jaw crusher.
- 1 Used TD-18 International tractor.
- 1 Rosco 750 gal. distributor mounted on Ford truck.
- 1 Parsons Model 200 trencher with gas engine.
- 1 Badger Model 202B trencher with gas engine.
- Used Vee and one-way snow plows.

All in good condition and  
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- HG-5 Allis Chalmers tractor loader.  
10 ton Huber steel roll.  
1 Unit shovel, 5/8 yd. dragline and shovel.  
2 TD-18 International tractors and dosers.  
3 LeTourneau Tournapulls  
1 HD-19 Allis Chalmers push cat.  
2 Caterpillar 11 motor graders w/snowplow & wing.  
1 Pioneer 40' conveyor, 24" belt, on rubber. Hopper and screen.  
1 Cedarapids 40' conveyor, 30" belt, on rubber. Hopper and screen.  
1 Universal crusher, 30" jaws, GMC 671 diesel power. Tandem rubber. Has field conveyor and dozer hopper.  
20 Dump trucks.  
3 International pickups.  
3 D7's & dozers.  
3 LP's Le Tourneau's.

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Victor Corron

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Phone: 198 or 361

## ARMY SURPLUS

- 500 cfm Ingersoll Rand diesel air comp.  
4/10 yd. Quickway "E" Comb. Dragline-Shovel.  
2—Mack 10 ton 6 x 6 truck.  
Cietrac Crawler Tractors - full rubber tracks.  
1 1/2-Ton Chev. 4 x 4's.  
2 1/2-Ton GMC 6 x 6's.  
7 1/2-Ton Biederman & Reo 6 x 6's.

## -- FORK LIFTS --

- 35 ea. 4000 lb. Clark Carloaders.  
3 ea. 6000 lb. Ross-Pneumatic Tires.  
3 ea. 10,000 lb. Ross-Pneumatic Tires.  
6 ea. 2000 lb. Mobilifts.

Bucyrus-Erie Hydraulic Bullgrader for TD-18.  
Thew Lorain 1 yard Shovel Front with Bucket ..... \$375.00

- Galion 8-12 ton Diesel Tandem Roller.  
2000, 4000 gal. Tank Trailers.  
3 KW - 50 KW Electric Power Plants.

Many other items - Write for list!

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## TWO (2) MODEL C TOURNAPULLS - 1952 Models - A-1 Condition

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DUKEHART-HUGHES TRACTOR &amp; EQUIP. CO., INC.

East 3rd and Vine Sts.

DES MOINES 2, IOWA

Ph. 2-8393 or 2-8394

## TRUCKS WANTED

Highest dollar value paid for new and used trucks and all kinds of used equipment. All types of truck equipment bought and sold, including war surplus. Write, phone or wire:

**BILL FISHEL**

**VANDEVENTER AUTO SALES**

717 So. Vandeventer Ave., St. Louis, Mo.  
PHONE FRANKLIN 1750

## FOR SALE

- One 440 bbl. Blaw-Knox cement batching plant, with elevator and cement screw, together with two 50 yd. aggregate bins with batchers. Meets Michigan State specifications. Price \$12,000.00
- One Model 700 P & H 1 1/2 yd. crane. Price \$5,500.00
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- Two Model F. P. 17 yd. LeTourneau scrapers, each \$3,500.00

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2840 Bay Road Saginaw, Michigan

## SURPLUS EQUIPMENT

**FOR SALE OR RENT**

Rebuilt—A1 Condition

- 1 Model 6 N.W. Shovel, diesel
- 1 Caterpillar D8 Bulldozer
- 1 Apco Stone Paver, Model P120
- 1 New Shovel Front for Model 6 N.W.
- 1 Used Shovel Front for Model 25 N.W.

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**CONSTRUCTION COMPANY**

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## FOR SALE

Butler Cement Batching & Storage Plant, includes 250 bbl. batching & 400 bbl. storage, 1 c.y. or 34-E batcher, under track screw, elevator, motor, complete. Used only one time.

Cedar Rapids crushing plant #3577, 1036 RB jaw, 3018 RB rolls, hard rubber wheels, 5th wheel pin, D13000 power unit, plant completely overhauled.

Asphalt plant drier, 60"x24", on wheels and 5 wheel pin, cold conveyor, gas power unit.

Admunt asphalt paver #199, gas power.

**THORNTON BROS. CO.**

1343 Dayton Ave. St. Paul, Minn.

## TRACTOR PARTS

Largest stock of new and used parts for crawler tractors in the Midwest at discount.

New TD-9 Track Chain.....\$360.00

Net per set

\$500.00 per set with Grousers

**WHITE TRACTOR PARTS  
& EQUIPMENT COMPANY**

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Do you have a problem? Would you like us to help you? We will attempt to help you solve your problems pertaining to management, personnel, customer relationship, cost data, prices to charge, how to figure cost, profit, materials needed for each job, how to get the maximum for less money, in fact any problem, no matter how small or how large, we will try to put you on the road to success if you will give us all the facts of information! Just any problem at all.

We do not charge a fee, there are no set prices, but if our solution to your problem serves your purpose, just send us whatever you think it is worth to you.

If we cannot help you, don't send us a thing. We would appreciate hearing from you. Just write to

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## SAVE UP TO \$2500.

**on "Like-New" Seaman Pulvi-Mixers!**

**For Road Mix, Land Clearing, Aggregate Aeration  
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These Seaman pull-type motorized mixing units are all recent models with only 180 to 400 hours of operation, look, sound and act like new. Guaranteed. All with heavy duty, K-type, clutched rotor; powered with Continental B-427 or GM 471 Diesel engines. Available in 5, 6, 7 foot widths.

Limited number; first come, first served. Write, wire or phone

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1—Diamond Model 36 Crushing Plant. International UD18 Power.....\$12,500.00

1—TD-9 International Tractor Dozer Shovel, Excel. Cond.....\$3,500.00

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We do a Nation-Wide business in

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We have Nation-wide reputation for offering

**QUICKEST SHIPMENTS**

All sizes Vulcan & McKiernan Pile Hammers & Extractors for rent—Shop Rebuilt

Regardless of location of job. Write or Phone

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Pioneer portable crushing plant, 9x36 jaw, 18x30 rolls, 3x12 vibrator screen, 318 Cat. Diesel power unit.

Lippmann crusher, 12x36,

3/4 yd. Northwest shovel, Model 2.

Austin-Western breaker, 20x36, 12 ft. feeder.

F.H.C. TD14 tractor with pulley.

Ingersoll-Rand wagon drill, M2X71 drifter.

Conveyor, 24 in. x 65 ft.

Vibrating screen, 2x8 TelSmith, 3 deck.

LeRoi-Rix 210 air compressor.

1/2 yd., 1/2 swing Bay City shovel.

**SMITH & KONKLE**

Route 1, Kaukauna, Wis.

Phone Little Chute 8-1422 or 8-2135

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2 - 9 W Monighans 12 c.y.

1 - 200 W Monighans 8 c.y.

1 - 5 W Monighans 6 c.y.

2 - 620 W Page 6 c.y.

1 - 1250 P&H Electric Shovel 2 1/2 c.y.

Catalog of used equipment furnished upon request.

(Also a good stock of 43B and 52B Bucyrus Erie parts.)

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**EXCELLENT CONDITION CRANES**

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5000# Cap. Mod. A-Ext. Boom

Pneu. Tires — A1 condition

\$4500

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GREATEST TIRE  
BARGAIN CENTER

### \*Slightly Used—Excellent Condition

600/20 6 Ply Hi-way Tread	\$10.00
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750/16 8 Ply Hi-way Tire and Tube	22.50
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825/20 14 Ply N.D. Combata	45.00
825/18 10 Ply N.D. Tread	25.00
825/15 12 & 14 Ply L.B. Trailer	45.00
1000/15 12 Ply L.B. Trailer	22.50
900/20 10 Ply N.D. Tread	28.95
900/20 14 Ply N.D. Combata	39.95
1100/20 12 & 14 Ply N.D. Tread	39.95
1100/20 12 Ply Hi-way Tread	34.95
1200/20 14 & 16 Ply N.D. Tread	34.95
1200/24 14 Ply Hi-way Tread	79.95
900/16 8 Ply N.D. Tread	12.95
1400/24 16 Ply Hi-way Tread	65.00
1400/24 20 Ply N.D. Tread	78.00

\*Every tire in perfect condition with 50 to 90% original tread.

### NEW TRUCK & EQUIPMENT TIRES

600/20 6 Ply Hi-way Tread	\$14.95
750/16 6 Ply N.D. Tread	23.95
750/16 8 Ply Hi-way Tread Tire & Tube	30.00
750/20 8 Ply N.D. Tread	39.95
750/15 10 Ply Tire & Tube	40.95
900/15 16 Ply L.B. Trailer	90.00
750/17 6 Ply N.D. Tread	29.95
1400/24 16 Ply Hi-way Tread	125.00
1200/24 8 Ply Grader	85.00
1100/20 12 Ply N.D. Tread	91.00

Tires shipped everywhere—25% with orders — fab Everett, Massachusetts. Call, wire or write—inquiries promptly answered.

### TIRE SALES & SERVICE CO.

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(IMMEDIATE DELIVERY)

## 8" & 12" LINE PIPE

170,000—8 3/4" O.D. .322 wall  
28.55 # Lapweld

150,000—12 1/4" O.D. .375 wall  
49.56 # Lapweld

#1 grade, all machine cleaned, commercially straight, 20' single random lengths, ends beveled. Used first class condition. Suitable installation oil, water or gas pipeline systems, 850 # to 900 # P.S.I. Priced attractively for prompt shipment, Welda, Kans. and Grandview, Mo.

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Send NOW For Complete Price List of **DEPENDABLE** Equipment  
We OWN and KNOW Will PERFORM.

Air Compressors & Tools - Tractors, Crawler & Wheel Earthmoving Equipment - Front End Loaders - Cranes - Draglines - Backhoes - Power Graders - Truck Cranes - Trenchers - Mixers, Concrete & Plaster - Pumps - Road Rollers - Sweepers.

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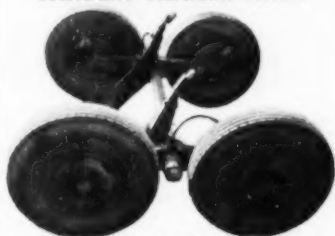
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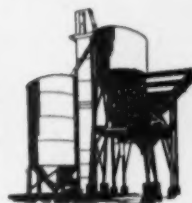
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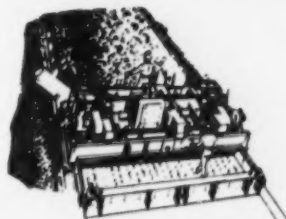
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